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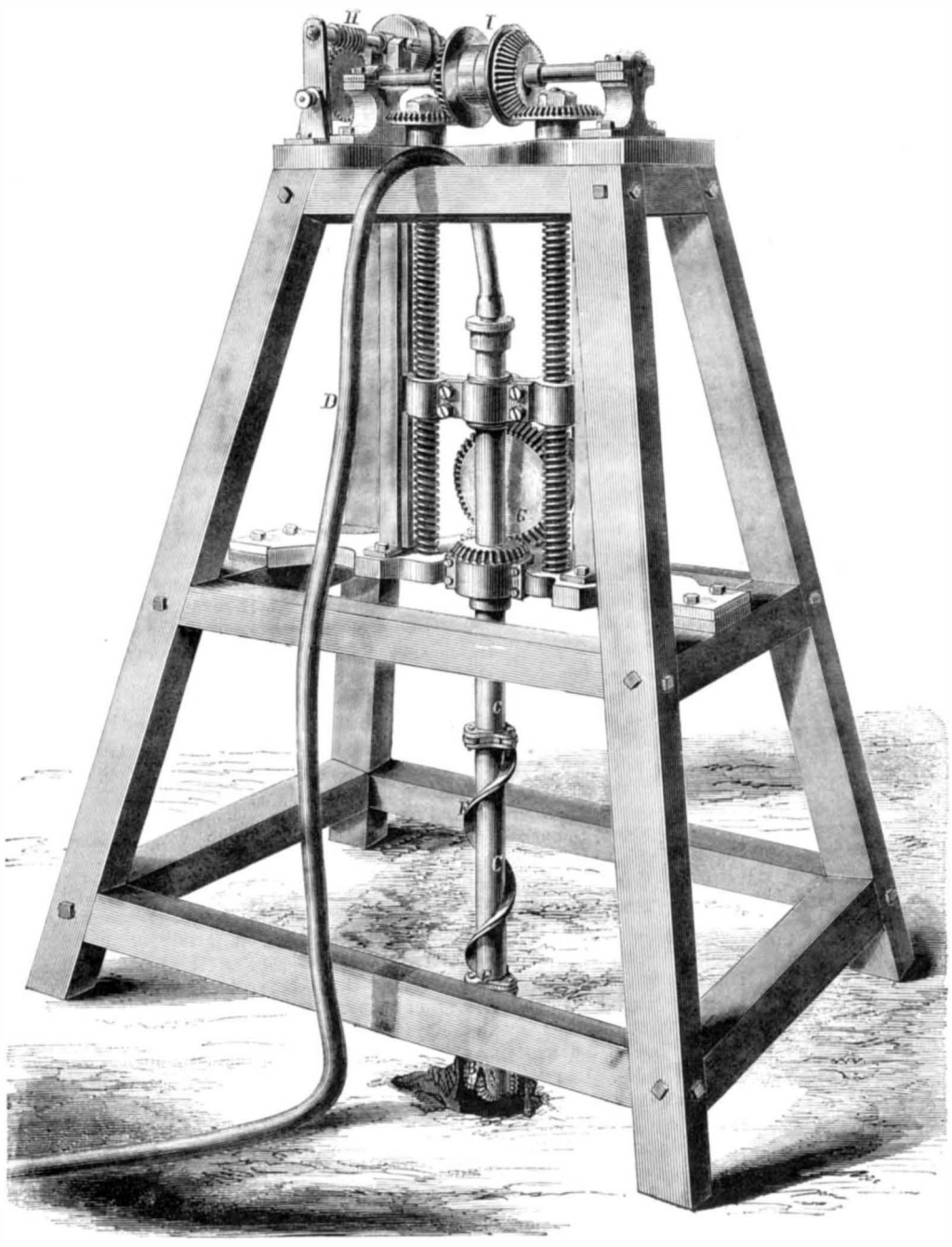
Rock Borer and Grooving Machine.

The peculiarity of this machine consists in the cutters by which the hole is bored. These cutters are in form like the domestic utensil known as a jagging iron, with which housewives ornament the edges of pastry. They are shown at A, and are four in number, one at each corner. Inside the stock, B, to which the cutters are secured are four other wheels, the center two are set obliquely with reference to their axes, so that by "wabbling," to use a common phrase, they cut over a great deal of space, acting on a small portion of the surface only at one time. By this arrangement no standing core is left and the hole is bored complete at one operation. The boring rod, C, which carries these cutters, is made hollow for the admission of water to the tools; this water is forced in through the tube, D, and serves to keep the cutters cool during their action. As the depth of the hole increases the boring rod is also lengthened, so that it would be unsteady in action unless some guide was provided. To prevent this difficulty Mr. Sweeney attaches a triangular yoke, E, to the boring stock, said yoke having three or more rollers in it. These rollers are externally just the size of the hole, so that they bear against its circumference as the cutters descend, and keep them straight. The helix, F, is to facilitate the ascent of the chips, so that the bore will not choke up.

The machinery by which the cutters is operated is not peculiar, rotation being imparted by the bevel wheels, G; attached to the shaft of these there is a pulley over which a belt passes. The feeder shown at H, and one leg of the standard which carries the worm shaft is made to raise so as to throw the worm out of gear when necessary. The pulley, I, is both fast and loose; that is to say, one of each sort, are placed side by side, and when the belt is shifted to the one or the other, the screws, which are right and left-handed, raise or lower the drill rapidly.

These features are the principal ones, and in regard to the capacity of the machine the inventor asserts that in addition to rock drilling it can be applied to sink shafts of any diameter up to twelve feet; also to drive headings in tunnels, mines, etc. It is also available in erecting light-houses or observatories; for all work in rocky bottoms where piles are to be used. It can likewise be used in submarine excavations for sinking piers for bridges and docks. Also for cutting down portions of rocks that may impede the channels of rivers, and thus render navigation dangerous and difficult. The machine is readily controlled by persons of ordinary ability, and is not complicated in detail; any of the parts can readily be repaired in an ordinary machine shop.

A patent is now pending on it through the Scientific American Patent Agency. Peter Sweeney, of New York City, is the inventor, and for further information address J. F. Flanagan, No. 80 Broadway, New York City.



SWEENEY'S ROTARY ROCK BORER AND TUNNELING MACHINE.

Glass Trade at the West.

There are fifteen bottle and vial factories fifteen window glass factories, and fifteen flint glass works in Pittsburgh, being forty-five glass works in all, an increase of forty per cent in number in eight years. There are in addition three flint glass works at Wheeling, and one at Stubenville. Also, three window glass works in the neighborhood of Brownsville, sixty miles from Pittsburgh. To the east of the Allegheny mountains, there are in New Jersey nine window-glass works, and twelve in the State of New York; six flint-glass works in Massachusetts, two in Brooklyn, one in Jersey City, two in Philadelphia, being eleven in all making flint glass, and twenty-one making window and other glass.

The fifteen window-glass works, located immediately at Pittsburgh, have a capacity to make 520,000 boxes of glass a year, but their average yield is about 400,000 boxes, whose entire value, at the present time, is $2,600,000. The fifteen green or vial works produce annually about 420,000 gross, or 60,480,900 of vials and bottles, worth, at present rates, $2,100,000. The pressure upon these works is best shown by the fact, that although only customary to run them for ten months in the year, yet many of them have ran twenty-one months without stopping.

The fifteen flint-glass works in operation at Pittsburgh, produce, at the present time, about 4,200 tuns of glassware, worth at present rates, in round numbers, two millions of dollars. Their capacity is, however, double the amount produced, or about 8,000 tuns. The quality of flint glass made in these fifteen works it is not necessary to note here, beyond the simple statement, that it is admitted by the trade, that the handsomest and best glassware in the United States is made at Pittsburgh.

PROTECTION FOR FIREMEN.—Rev. Benjamin I. Lane, a Baptist clergyman at South Farmington, Mass., has invented a jacket and mask to protect firemen from the smoke and flame of a burning building while pursuing their arduous duties. The apparatus has had several trials in Boston and works well.

SHOW OF POULTRY.—A great poultry show will open at Barnum's Museum on the 24th inst.

THEY have a factory in Danbury where they put springs into hat rims—hoop skirt them.

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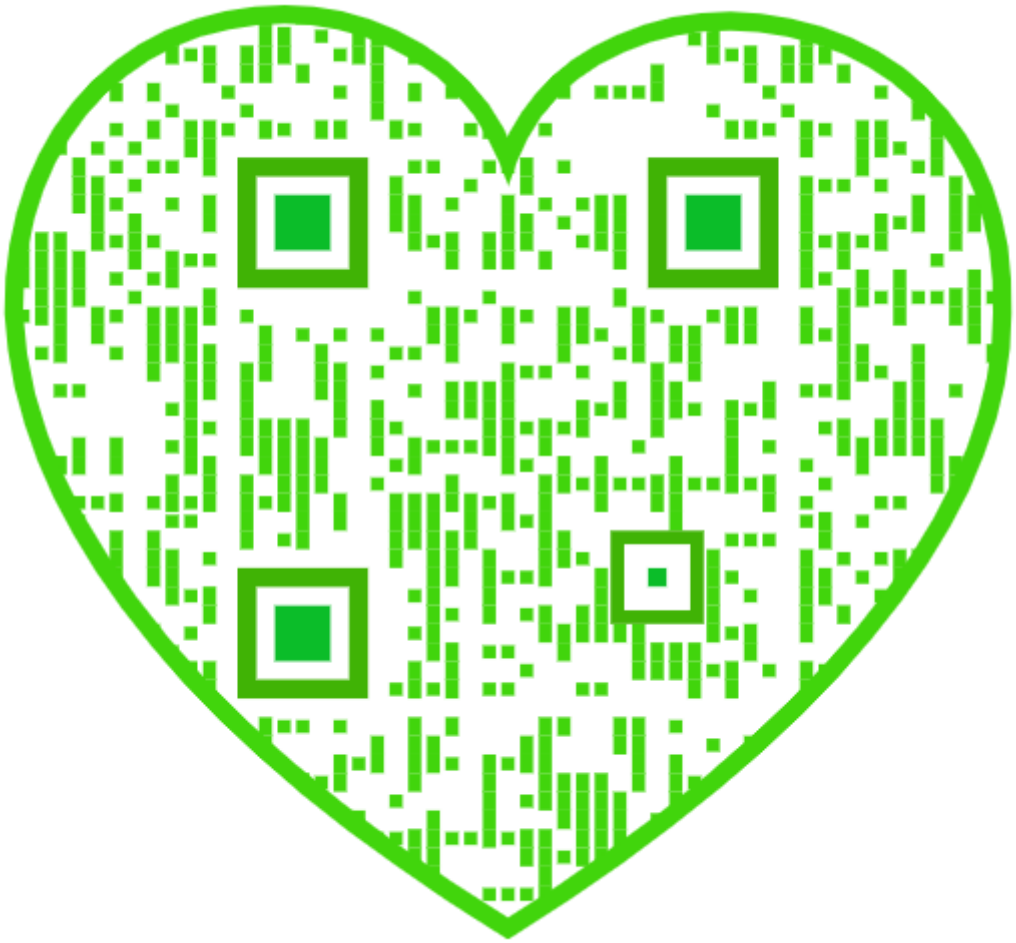

The Work of Different Countries.

An English journal of late date has the following:—

"Industry has many curious local attachments, and clings with feline fondness to particular spots. Thus, watches are made cheaply in Switzerland, where the men and women of fifty villages together are all busy on toothed wheels, mainsprings, and jeweled holes. Soap and cheap perfumes, nasty as well as cheap, are best compounded in central Germany. The Tyrol and the Black Forest have three resources for the long winter evenings, when the soil is frozen stiff, and the snow is heavy on the pine boughs—clocks, straw hats, and toys. All over Middle Europe you see the Black Forest clocks, made by peasants round the cottage hearth, as plentiful as Mr. Samuel Slick's lacquered time-pieces in Canada. Baden competes with Italy in straw-plaiting; while for toys, old Deutschland bears the bell.

"It is a curious thing that the toys which English children love so dearly, and which they break, maltreat, and demolish so vivaciously, should all be foreign. Here and there, perhaps, a rocking-horse, or a straight-legged spotted steed with his harness nailed to his body, may be the work of an English artisan, but not often.

"The wooden beasts and birds in the zoological collections, the puzzles, the bricks, the gaudily-dressed Turks and hussars, squeaking lambs, and creaking cards, come from Germany; so do marbles, Dutch dolls, and baby-houses. Paris gives us the superb waxen doll, in her satin and spangles. America sends over the gutta-percha uglinesses and clock-work mice.

"Quite two-thirds of the overshoes that keep our feet from wet bear the French or American eagle boastfully embossed upon their soles. On the other hand, England sells India-rubber tubing, water-proof cloth, and gutta-percha in fifty forms to Continental nations. The French buy more of our brandy than we do of theirs—an exchange of which we wish them joy; while our silks continue the cheapest, and theirs the richest and most tasteful. In all that relates to calico they own our merit; they perfer our broadcloth to their own, but declare, and justly, the superiority of their scarlet-dyed woollens to ours. As for boots, they are cut out by millions of pairs in France, sent to England to be closed, returned for the operation of 'cliching,' and re-exported as of pure Paris make.

"The Americans have great aptitude for the manufacture of small, delicate, labor-saving machines. It has always been an object with them to get through their work with as few hands as possible, and we owe to them all manner of dainty devices for economizing manual power. London is full of elegant little complications of steel rods no bigger than a wine bottle, devised for stitching all stitchable materials, for punching, drilling, and cutting, for metallurgy, and agriculture. Our own machinery is commonly of a grand and solid character—great massive engines that are to be found at work all over the world pumping water out of mines in the Andes, lashing the waves of far-off oceans into foam, crushing quartz in Victoria, and dragging burdens in Brazil.

"We cannot, perhaps, quite beat Prague in turning out stained glass and colored services glowing with the deep pure tints of enormous rubies, emeralds, and topazes; nor are our tubes and alembics so fit to go through fire as the Bohemian. The old ware of China, the old Japanese jars, the finest French and German porcelain, have a fragile beauty beyond our imitations. But our potteries only need the 'open sesame' of free trade to set their good and cheap products—plates that can bear heat, glass fairly cut into sharp facets, and vases modeled on choice shapes from Greece and Etruria—on every middle class table abroad. French housewives who store away their preserves in jars coated with poisonous white lead, and dare not heat the plates lest they should fly into fragments, and whose clumsy coffee-cups are an inch thick, are not slow to appreciate the merits of Mr. Gladstone's treaty of commerce."

Paraffine.

The uses of paraffine are truly astonishing. Several refineries are required to furnish enough to make chewing gum, which is highly recommended for constant use in ladies' sewing circles, and among gossipping neighbors, etc. A story is told of a Cincinnati refiner who had several tuns of paraffine on hand, nicely deodorized, and the demand was light. He sent a man through the towns of Ohio, and bought all the beeswax he could get, paying about forty cents. To one hundred pounds of beeswax he adds five hundred pounds of paraffine, same color and consistence and general appearance, but worth five cents a pound. Now they may detect the odor, he thought; so he put it up in oil barrels, putting the brand "Star Refinery," Cincinnati, Ohio, (the name, of course, is suppressed.) He anoints the barrels outside with petroleum, ships to New York to several merchants a hundred tuns of pure beeswax, with this blinder at one end of each invoice: "Boxes are scarce, and I send the wax in refined oil barrels; you can sell the barrels." The wax opens well—fine lot—very uniform—smells of the barrels a *little*—sells at eighty-eight cents per pound. Imagine the profits—five-sixths paraffine, one-sixth beeswax.

Production of Ammonia.

Shall we ever be able to produce ammonia on the great scale artificially? In the nitrogen of the atmosphere and the hydrogen of water, its elements are everywhere at hand; who will teach us how to compound them into volatile alkali, by a method practicable as a manufacturing process? Cheap ammonia would be a great boon to the agriculturist, and by no means to him only. Could this body be had for a few pounds per tun it would entirely revolutionize one of the chemical industries, and by far the most important of them all. There is a saying that the degree of civilization of a country may be judged of by the quantity of sulphuric acid which it consumes. This is because sulphuric acid has hitherto been the chief agent in the alkali manufacture, and has so lain at the base of the whole edifice of applied chemistry. With ammonia, at the price suggested, however, we should no longer use sulphuric acid in the manufacture of soda; instead of converting chloride of sodium into sulphate of soda by heating it with oil of vitriol, and then transforming this sulphate, first into sulphide and then into carbonate, by calcining it in contact with lime and coal, we should obtain bicarbonate of soda at one operation by adding ammonia to chloride of sodium, in solution, and passing carbonic acid gas through the mixture; and the saying just quoted would thus cease to be valid. What is of more importance, soda would be cheapened, and cheaper soda would mean cheaper soap, cheaper glass, and many other less tangible advantages. And this is only one of many results which would accrue from the command of cheap ammonia.

Well, some little fresh light has lately been thrown on the question of the synthesis of ammonia, which will never be obtainable cheaply enough for use in the soda manufacture unless it can be produced synthetically. In the first place, M. Decharme has published the results of a series of experiments on "the production of ammonia from air and water under the sole influence of the porosity of the soil." In these experiments he carefully deprived soil of whatever ammonia it might already contain, then moistened it, and then passed through it currents of air, also carefully deprived of its natural ammonia. After the air had passed for a longer or a shorter period, he tested the soil, and invariably found ammonia in it, proving that porous soil has the property of causing the nitrogen of air to combine with the hydrogen of water to form one of the most important elements of the food of plants. Hence "the good effect of airy drainage and plowing, the improvement of land by fallowing, the practicability of cultivation without manure, and the presence of nitrogen in plants grown in an artificial soil, in an atmosphere entirely freed from ammonia, and watered with chemically pure water." Second, At a recent meeting of the Chemical Society, Mr. Buckton, in exhibiting a specimen of the mineral *boussingaulite*, found in the neighborhood of the Soffioni of Tuscany, and containing eighty per cent of sulphate of ammonia, explained, by way of suggesting how this mineral was formed, that he had obtained sulphate of ammonia artificially by passing a mixture of sulphuretted hydrogen, air and steam through a heated earthenware tube. Under these circumstances, both the sulphuretted hydrogen and the steam are decomposed; the sulphur of the sulphuretted hydrogen uniting with the oxygen of the steam and of the air to form sulphuric acid, and the hydrogen both of the sulphuretted hydrogen and of the steam uniting with the nitrogen of the air to form ammonia. Lastly, this statement of Mr. Buckton's has led Mr. Wentworth L. Scott to publish the fact that he has found that ammonia is always produced when "deammoniated air is passed over small nodules of pumice stone, about 0·1 to 0·2 inch in diameter, and moistened with either pure water or dilute solutions of certain salts." Mr. Scott states that he has been engaged in researches in this direction for several years past, and promises to publish by-and-bye a full account of his experiments and their results. We are clearly making progress toward an end, the accomplishment of which would be as great an achievement as any of this age.—*Mechanics' Magazine.*

Rebel Abatis at Petersburg.

A war correspondent says:—Passing through our line of earthworks, no longer swarming with their garrison, and crossing the trench just beyond which sheltered our outer pickets, I found myself in the rebel rifle pits. A devious covered way led me to their abatis. Their manner of constructing this defence is very different from that of the Union engineers. Our system is very simple, consisting of stout poles, two inches in diameter and ten or fifteen feet long, planted firmly in the earth and inclining outward at an angle with the ground of about thirty degrees. The outer ends are sharpened, and beneath them, lying on the ground, are placed the bristling boughs and tops of evergreen trees. The poles are set very close together, and it seems as if it must be an impossibility for an enemy to break through them without a long pause and the aid of axes. The abatis on the rebel defences is most unlike this, in appearance and principle. It resembles somewhat a long row of saw-horses, set up together endwise, with the upper ends of the outer limbs sharpened to a point—and I think of no terms in which I can more clearly describe it. Each one of these saw-horses is distinct in itself, and as they are not very deeply imbedded in the ground, and may be easily pushed around by forces inside, they afford no obstacle to the egress of a column on a sortie, although they are formidable interruptions to the advance of an attacking party from without.

The Three Sand Rocks.

In boring for oil, no man expects to find it until he has reached and passed through a whitish sand rock, lying at depths varying from seventy-five to two hundred and seventy-five feet in the valleys. This is called, by way of distinction, the "first sand rock," although the borer may have passed through a dozen different sand rock, alternating with shales, before having reached the "sand rock." Very generally, a well, stopped after having penetrated this rock, yields a heavy, thick oil, considered specially valuable for lubricating purposes, and commanding nearly double the market value of the light oils. From one hundred to two hundred feet below this lies another, very similar, and called the "second sand rock." Having penetrated through this, the borer is usually rewarded with another "show of oil." This, too, is a very heavy oil, though not commonly so heavy as the former. From this rock is produced nearly all the oil along the Allegheny river, while the wells on French creek are nearly all completed in the "first sand rock." But, to reach the great oil fountains, the drill must make another plunge of from one hundred to two hundred feet, when a "third sand rock" is reached. From beneath this rock out gushes the pure, limpid, light oil. Here, too, are reached most, not all, the great "flowing," or rather spouting wells; some of them having deluged the land at first with 3,000 barrels per day—the "Empire well" for instance. The wells of Oil Creek are mostly in this rock.

The English Lock-out.

The Birmingham correspondent of the London *Engineer*, of March 24th, says:—

"The only change in the position of affairs relative to the lock-out, as compared with last week, is that an attempt is to be made to obtain a supply of non-unionists to go from South Staffordshire into the north of that county and start the furnaces which the men on strike refuse to work. A person who is well accredited has come forward and offered to obtain 500 men within a week, if he and his volunteers can be

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protected from violence. At a meeting of the committee of the Ironmasters' Association held in Wolverhampton on Wednesday, the offer was accepted, and an application was made to the Lord Lieutenant of the county for the needed protection. At the same meeting, the committee expressed themselves as altogether unable to give the Brierley Hill executive credit for their sincerity in their professed discountenancing of the North Staffordshire puddlers, facts having been brought to the knowledge of the committee which led them to conclude that, to say the least, the executive are winking at assistance being rendered. Very little more confidence was expressed in the Gateshead union; but the mill-men were spoken of in terms approaching to confidence in the sincerity of their motives relative to the North Staffordshire men. To show that the masters in South Staffordshire are equally willing with those in the North of England to come to terms with their men, the committee recommended the North Staffordshire masters to see a number of their men, to ascertain of what they complain and why they refuse to go to work. But no great confidence is expressed in the business result of the interview, for it is believed that the men will demand the wages for which they have struck, whilst their masters will certainly refuse to give it. All hope in the termination of the lock-out within a reasonable time is centered in the result of the scheme for introducing non-unionists into North Staffordshird. The masters continue to confine their attention to the question which brought about the lock-out—that of wages—and refuse to entertain any project for breaking up the union. They have no objection to their men having a union, if that union will only confine itself to legitimate business and not make itself intolerable by interference with the management of works."

A New Kind of Electrifying Machine.

The electro-magnetic coil has, in a great measure, superseded the electrifying machine; the latter, however, will never cease to be an object of interest; and, it is probable, will always be preferred for some purposes. The expense and difficulty of managing large plates and cylinders of glass have hitherto been obstacles to the use of large electrifying machines. These obstacles appear now removed—glass being rendered unnecessary by the discovery of a far more convenient and effective material. M. Edmond Bequerel exhibited to the Academy of Sciences on a recent occasion an electrifying machine, the plate of which was made of indurated red sulphur, the invention of a civil engineer. It was eighty centimetres in diameter, and afforded a spark fourteen centimetres in length. No amalgamated cushions were required with it, the skin of a cat being quite sufficient to produce every desired effect. Sulphur undergoes extraordinary changes by successive fusions; becoming extremely hard and tenacious. After the third fusion it no longer acts on metals, or possesses its characteristic odor. The plate used by M. Bequerel was formed by fusing the sulphur three times in a cast-iron vessel, at a temperature between 250° and 300° Cent., and allowing it, after each fusion, to cool thoroughly. After the first and second fusions it was crushed to a coarse powder; and, after the third, it was poured into a plaster mold. Plates four metres in diameter may easily be made in this way; they cost extremely little; and, besides being more efficient, are far less hygrometric than glass.—*Intellectual Observer.*

Aluminum Bronze for Coins.

During the past year, says the Director of the U. S. mint, some interesting experiments were made with aluminum as an alloy for coins; not with a view to displace the bronze coinage, but to propose a system of tokens for five and ten cents. More than two years ago experiments were made in aluminum alloys to try their fitness for medals. Information was received from Paris that the introduction of only one per cent of aluminum into fine silver would resist the sulphuretted tarnish which is so apt to attack that metal in certain exposures. The experiments made here did not confirm that statement; on the contrary a slip of this alloy (99 silver to 1 aluminum) suffered more discoloration from the vapor of sulphuretted hydrogen than a slip of fine silver. The alloy was also much harder. An alloy of thirteen parts copper with one of aluminum was then tried, and another of nineteen parts copper to one of aluminum. The former gave a pale gold color, the latter the color of standard gold coin—both beautiful but too nearly resembling that precious metal. Under the press, however, they were both found to be so hard and stubborn, in spite of repeated blows, as to be quite impracticable. The question, however, was still open, whether a different proportion, and the low relief used for coin, would not give a satisfactory result. In fact, we had specimens of aluminum bronze coinage, effected by European manufacturers of aluminum, which proved that the striking was at least practicable, if not easy.

The Cornish Engine Deteriorating.

It appears from a report in the London *Mining Journal*, that the Cornish engine is failing to work as economically as in former years. This deterioration is probably as the authority in question says from want of care and proper attendance. We quote:—

"In the year 1811 Mr. Joel Lean began to report the performances of the Cornish engines, and during that year, it is said, issued his first engine report. In the year 1827 an eminent engineer, Capt. Samuel Grose, commenced to improve the duty of steam engines at Great Wheel Towan. It is believed that practical experience has done more than scientific researches in procuring the high econemy of fuel. which has been the result, and that this has been principally effected by the use of high pressure steam expansively employed, and using Mr. Trevithick's boilers, and clothing the steam pipes and cylinders with a non-conducting material, together with great attention of the enginemen to the fires, so as to make the best of every bushel of coals consumed, as some enginemen are now doing on the railways.

"In 1843 the average duty for 94 lbs. of coal was 60,000,000 lbs., while in 1856 it had steadily decreased to 47,000,000 lbs., for the same fuel. It is to be deeply regretted that the duty of our steam engines is decreasing, and that many of the important lessons taught by Capt. Grose appear to be forgotton; whilst we are brought familiar with the rapid improvements of locomotive and marine engines, we have to deplore a retrograde movement of the stationary engines in our Cornish mines. With the present low price of minerals, and reduced dividends, we certainly ought to try to bring up the duty of our steam engines to where it was in 1843. The number of pumping engines reported for January is 37. They have consumed 2846 tuns of coal, and lifted 22·3 million tuns of water ten frames high. The average duty of the whole is, therefore, 52,800,000 lbs. lifted one foot high, by the consumption of 112 lbs. of coal."

Solution of India-rubber.

A solution of caoutchouc or india-rubber, for repairing india-rubber shoes, is prepared in the following manner:—Cut two pounds of caoutchouc into thin, small slices; put them in a vessel of tinned sheet-iron, and pour over twelve to fourteen pounds of sulphide of carbon. For the promotion of solution place the vessel in another containing water previously heated up to about 86° Fahrenheit. The solution will take place promptly; but the fluid will thicken very soon, and thus render the application difficult if not impossible. In order to prevent this thickening and difficulty, a solution of caoutchouc and rosin (colophony) in spirits of turpentine must be added to the solution of caoutchouc in sulphide of carbon, and in such quantity that the mixture obtains the consistency of a thin paste. The solution of caoutchouc and rosin in spirits of turpentine should be prepared as follows:—Cut one pound of caoutchouc into thin, small slices; heat them in a suitable vessel over a moderate coal fire until the caoutchouc becomes fluid, then add one-half pound of powdered rosin, and melt both materials at a moderate heat. When these materials are perfectly fluid, then gradually add three or four pounds of spirits of turpentine in small portions, and stir well. By the addition of this last solution, the rapid thickening and hardening of the compound will be prevented, and a mixture obtained fully answering the purpose of gluing together rubber surfaces, etc.—*American Drug Circular.*

For a good no-chimney lamp see the advertisement of the New York Lamp Company, in another column.

Directions for Making Blacking.

Liquid.—Ivory black, in fine powder, 1 lb.; molasses, 3-4 lb.; sweet oil, 2 oz.; beer and vinegar, of each, 1 pint. Rub together the first three until the oil be perfectly "killed," then add the beer and vinegar. Ivory-black and treacle, of each 1 lb.; sweet oil and oil of vitriol, of each 1-4 lb. Mix the first three as before, then gradually add the vitriol, diluted with thrice its weight of water; mix well, and let it stand for 3 hours, when it may be reduced to a proper consistence with water or sour beer.

Paste.—Molasses, 1 lb.; ivory-black 1 1-4 lbs.; sweet oil, 2 oz.; rub together as before, then add a little lemon juice or strong vinegar. Ivory black, 2 lbs.; molasses, 1 lb.: olive oil and oil of vitriol, of each 1-4 lb.; water q. s., as before.

The manipulations required for paste and liquid blacking are the same, the difference in the two being the quantity of liquid added. Thus, by diluting paste blacking with water or beer bottoms, it may be converted into liquid blacking of a similar quality, and, by using less fluid matter, the ingredients of liquid blacking will produce paste blacking. One thing must, however, be observed, and that is, that the ivory-black used for liquid blacking must be reduced to a much finer powder than for paste blacking, as, if this be not attended to, it will settle to the bottom, and be with difficulty diffused again through the liquid. For those persons who do not like the use of blacking containing oil of vitriol, the first of the above forms, either for paste or liquid, may be adopted. The vitriol, however, greatly contributes to promote the shining properties of the blacking, and in small quantities is not so injurious to the leather as has been falsely represented, as it wholly unites itself to the lime of the phosphate contained in the ivory-black, and is thus partly neutralized. This is the reason why lamp-black should never be employed for blacking, as it has no earthy base to absorb or neutralize the acid, which would then prove very hurtful to the leather. Oil of vitriol is now employed in the manufacture of all the most celebrated shining blackings. The addition of white of eggs, isinglass, gum arabic, and similar articles to blacking, always proves injurious, as they tend to stiffen the leather and to make it crack.—*Cooley.*

A Curious Clock.

A number of Union mechanics from the rebel prisons, now at the hospital of the Union Volunteer Refreshment Saloon, Phil., brought with them from Dixie a piece of their handiwork, well worth special mention. It consists of a clock, made to wile away their we ry hours at Salisbury, N. C., during their imprisonment last winter. The main spring is made from the blade of a saber which once belonged to Stonewall Jackson. The hair-spring and balance-wheel were taken from the telegraph office timepiece, Andersonville, Ga. The hands are made of a toasting-fork from the kitchen of Vice-President Stephens. The wheels are made from the mountings of carriages, &c., of prominent southerners. The pillars which connect the frame are made of a ramrod, and nearly all the parts are taken from something picked up in the confederacy, and have more or less romance attached to them. A saw used in constructing this interesting little piece of mechanism was made of a table-knife; and files, jack-knives, &c., used in making rings, were often called into requisition by the anxious workmen.

Plants From Cuttings.

Peter Henderson, of Jersey City, a noted propagator, gives a simple mode of raising plants from cuttings, such as roses, verbenas, carnations etc., adapted to inexperienced cultivators, although not the mode used on an extended scale. A common flower-pot saucer, or even a common kitchen saucer or other dish, is filled with sand and the cuttings inserted thickly in it. It is then watered until it becomes about as liquid as mud.

The cuttings should, of course, be of green or unripened wood, three or four inches long, placed in a strong light in a room or green house, kept in a temperature of fifty to eighty degrees, best at seventy to seventy-five degrees, allowed to remain from ten to twenty days, till rooted, and the sand kept constantly in this semi-fluid state, for if they become partly dry they are ruined.

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THE OIL REGIONS OF PENNSYLVANIA.

[For the Scientific American.]

GEOLOGICAL FORMATION.

That section of Western Pennsylvania known as the Oil Regions, is exceedingly simple in its geological compositlon. Like much of Western Virginia, Eastern and Southern Ohio, Southern Indiana, and Northern Kentucky, its surface was once a nearly level table-land, at least 400 feet higher than its principal river beds are to-day. In the course of ages, however, these rivers and their tributaries wore their channels down to the present depth, leaving the country on each side cut up into ridges or steep hills, with more or less extensive plateaus on their summits. Near the Ohio, as it passes between West Virginia and the State of Ohio, the stratification is almost horizontal, indicating that the hills have not been upheaved by the internal forces of the earth, but left exposed by the action of water. Further, it is noticeable at numerous points on both sides, that near the river the summits are narrowed almost to a ridge, while further inland they grow broader; the action of tributary streams being there less powerful in the work of erosion or denudation. The valleys and bottoms are also less deep and wide as we recede rom the banks of the great river.

The general course of the Alleghany lies nearly 100 miles more to the eastward than that of the Ohio in the section referred to. In the former case the rocks have an inclination of a few degrees (never exceeding ten) to the westward. There is this further difference between the two States. In West Virginia, the principal rocks are *clay shales* of different colors, alternating with coal-beds, some of these being above and others below the river level. In Western Pennsylvania the formations consist of *shales* and *sand-stones*, arranged in alternate layers, with boulder drift deposited pretty generally over the surface of the country. This drift consists of water-worn blocks of gneiss, quartz, and other primitive rocks, none of which belong to the hills or mountains in that part of the country.

Passing through the drift, the first layer of rocks consists of sandstone, rather coarse in texture, sparkling, of a grey or nearly white color, and falling from the summits to the bases of the hills in huge quadrangular blocks, exceedingly tempting to the eye of the practical man. These lapses of the upper rocks are caused by the soft shales underneath being carried away by the action of wind and water, so as to undermine the overhanging crags, whose threatening aspect imparts a degree of sublimity to much of the scenery of the Alleghany.

The sandstone is known as the Vergent or Portage variety, though said to differ slightly from that stone as found in the State of New York. Like the shales it contains numerous fossiliferous remains, the imprints of stems, leaves, bark and berries of trees, casts of the shells of various marine creatures, chiefly bivalves. The writer has observed the faces of many of the slabs of rock thus covered, and traces of such remains are said to become still more frequent as one descends the terraces leading from the Alleghany valley to Lake Erie. On the border of French Creek, above these fossil-beds, is a layer of a coarse yellow sandstone, used for building purposes. The vergent sandstone contains more or less lime in its composition. The shales also contain abundant organic remains, and are known to be highly butuminous in places. The soil formed from the decomposition of these rocks is a stiff clay, but probably more productive than it has received credit for being, the difficulty in cultivating it arising from the number of huge boulders of grey sandstone covering the slopes.

It will thus be seen that the sandstones ordinarily spoken of by well diggers as first, second, third, and fourth, are really the second, third, fourth, and fifth. These men make no account of the layer of each lying above the valley, having got the impression that the heights were formed by upheaval.

FIRST DISCOVERY.

The first discoveries of oil were made in the bed of sandstone commonly termed the first rock. To reach this deposit, less than 100 feet had to be bored; but the yield, through pretty abundant at first, soon began to show symptoms of exhaustion, and ultimately the wells ran dry. At this time a hue and cry was propagated all over the country that the oil discovery was an egregious humbug, if not a swindle. In 1860 and 1861 several wells were carried down to the second (really the third) sand-rock, the borings being usually made from 250 to 300 feet in depth. This layer yielded better than the former, the springs holding out from six months to two years. Even a few of those wells are still paying expenses, though having decreased decidedly from their former products.

In 1863 and last year, attempts were made to reach the third sandstone, at various depths, from 450 to 550 feet, according to elevation. The success which attended works that had been run down to that depth on Oil Creek has led to a pretty general movement in the same direction this spring, on the part of those owners of wells which had given out. Some hundreds of them are now being bored and reamed out to the depth of 550 feet in the bottoms, and 600 to 750 on upper ravines and hill-sides. Along the Alleghany, for some miles above Oil City, this experiment has proved a failure in almost every instance, while on Oil Creek it is as commonly successful.

DEEPENING THE WELLS.

Near Titusville a well is now being deepened, the design, it is understood, being to run it through the *fourth* sand-rock to the depth of 1200 or even 1500 feet, so as to reach the tempting liquid anyhow. The world will regard the results of this experiment with much interest.

There is a general *upward* movement, as well as a downward one, the present season. All the ravines entering Oil Creek, Pithole Creek, Cherry Run, &c., are being punctured by the borers; even derricks are erecting on the precipitous hill-sides and the table-lands above. In some cases oil has been reached, and even good springs been tapped there, but those in the second rock will probably be found to resemble the springs found in the first rock (so called) in the summer of 1859.

The belief is now very general among oil men, that the uplands will yield as freely as the river-bottoms, provided the veins are struck, which, so far, is rather a matter of *luck* than the result of scientific research. If the theory laid down above, as to the formation of the hills, be accepted, there will appear every reason short of actual experiments to suppose that as good results can be brought about in one locality as in another.

Per contra, the discovery of oil on the *hills* will call for the introduction of heavier machinery to pump it from the bottom of the deeper wells which must be constructed. The sinking of these, too, will require not only a heavier outlay in itself, but relatively in proportion to the greater depth reached. Some experts consider that *flowing* wells need not be expected at elevations of 300 or 400 feet above the river-beds; though this seems only matter of conjecture rather than of knowledge based upon ascertained facts.

FUTURE PROSPECTS.

But one of two things is certain, namely; either a cessation finally in that natural product, or such an extension of it, by means of new wells and discoveries of oil in other localities, as to reduce the boring for it to a level common with all branches of industry. Before that time it is likely enough to undergo depressions as well as elevations—to experience conditions in which the article will be called a drug, and those engaged in producing it *fools*, by the outside world. Persons who visit the oil regions, especially the numerous creeks and rivers which discharge their waters into the Alleghany, Oil Creek, French Creek, &c., are struck with the immense number of derricks arising in all directions this year. They stand along the headwaters of Cherry Run like the masts of vessels, as closely by each other in places as they can be erected and find room to stand. It is no difficult matter to stand in one's step, and count from 50 to 100 within half a mile. On one farm near the head of Pithole Creek, at least 250 feet above the Alleghany, the writer was informed that a single company had engaged to sink 25 wells the present season.

INTERFERENCE.

The mutual effect upon each other of wells so closely sunk, cannot be calculated in advance. The great Philips well, which at one time yielded nearly 4000 barrels per day, was weakened and finally overcome as a flowing well, by the sinking of another within 75 feet. The theory usually entertained is, that the force of the gas being spent in two directions, it is unable to give due effect to either, and resort must be had to the pumps. In other cases, it is said that the sound of gas and water escaping through a well has been heard in an adjoinlng one, proving that both had tapped a common source. At the same time this rule is not universal. The writer was informed by an experienced borer, that his flowing spring of 200 barrels a day was sought to be reached by a neighbor at two points, the first eleven, and the second only seventeen feet from his own well. Numbers two and three were sunk fully as deep as number one, but the former failed to get a drop of oil, while the latter was rewarded with only one barrel per day, and both wells were abandoned.

MACHINERY AND COST.

In accordance with the changes taking place in and about the wells this spring, more powerful machinery is being introduced. The engines used to bore and pump were at first contemptibly small, the boilers being barely 24 inches in diameter, and 5 or 6 feet in length, with a capacity of 7 or 8 horse-power; no boilers of less than 30 inches diameter are now called for, and those of 35 inches are largely in demand, with from 12 to 15 horse-power. The derricks are mostly erected 50 feet high, or 15 feet taller than formerly, an upper story being added to many of the old ones.

The cost of boring wells has done more than keep pace with the greater depth reached and heavier machinery used. At first about $1,500 sufficed to erect the derrick, pay for the engine and fixtures, together with the labor of doing the work. No individual or company need *now* expect to put down a well in the bottoms for less than $7,500, unless using an engine already working on the ground, while on the uplands the cost will run up to $10,000, according to situation. A good-sized engine delivered on the ground costs about $2,500.

EFFECT OF BLOWERS.

To cooperate with nature in raising oil, the *blower* has recently been introduced with good success in some wells, which had not only ceased to flow, but given out under the pumps. This arrangement is very simple. It consists of a long iron pipe, usually about one inch in diameter, made in sections and screwed together, after which it is let down into the well. The lower end is made to turn *upward*. Through this pipe a strong current of air is forced down, which, on reaching the bottom, assists materially the gas in forcing up the oil and water. The famous old Sherman well, which used to flow 600 barrels of oil daily, and more recently yielded one-third of that quantity in obedience to the pump, now gives between 60 and 70 barrels with the aid of the "blower," after having been several months dry. Among others, the Noble well, directly across Oil Creek, having also dried up, is being refitted with a blower, from which good results are expected.

FARMING IN THE OIL REGION.

There is no likelihood of any agricultural operations going on this season in the oil regions. Farmers prefer to pocket from $2,000 to $5,000 per acre for their fields and migrate elsewhere, to plowing, and sowing, and reaping, among the boulders covering the surface of their grounds. To the writer it has long appeared certain, that by boring distances of from 12 to 18 inches with a *plow-share*, a very large flow of oil could certainly be reached, through potatoes, turnips, cabbages, beans, peas, and other garden products. One thousand gardeners at the East, some of whom can hardly make ends meet there, could enrich themselves by raising "truck" and even milk in Petrolia. The only obstacle would arise from the difficulty of leasing land, but this could be overcome.

MECHANICS IN DEMAND.

Blacksmiths, wood-choppers, and engineers are still in demand; the first to sharpen tools. Their wages vary from $2 per day up to twice that figure, with board and lodging; but he who goes out to Oildom in such capacity, must make up his mind to forego most of the comforts and enjoyments of civilized life, excepting a brisk appetite and good digestion, for Petrolia is eminently a healthy country, in spite of the coarse fare, indifferent shelter, and (often) lack of cleanliness prevailing among its population. All other visitors must expect with terrible

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roads, plain fare, hard beds, and extravagant charges. Such is Petrolia.

UTILIZATION OF THE GAS.

Of *economy*, as usually practised in older countries, Petrolia has as yet known little. Until wood commanded from $10 to $12 per cord, and coal more than $20 per ton (it is now about $28), no attempt was made to convert the columns of gas escaping from the wells into an agent for driving the engines. This has, however, at last been accomplished with the most complete success on the Watson flats, below Titusville, where half a dozen pumps are driven by gas. The writer has heard no complaints about the capturing of this (hitherto) fugitive slave interfering with the productiveness of any of the wells. All visitors, as well as the men concerned about these works, expressed their admiration at this beautiful arrangement, so simple and economical in itself. Of the still superfluous carbureted hydrogen, one well manager, or proprietor, took sufficient from it to heat up his premises, by letting it into the stove and using it for culinary purposes.

On the other hand, the same experiment made last winter at one of the wells ("the Yankee"), on Cherry Run, is said to have resulted in reducing its productive power nearly two-thirds, or from about 60 to 25 barrels per day, by checking the escape of gas from the tube, and thus weakening its power to expel the oil. So seriously was this felt that the attempt was abandoned, and the flow of oil returned to its former amount. The owners of that well have leased a large number of lots to other interests, and since that trial they have made it a point to insert a clause in every lease, prohibiting the lessees from thus appropriating the gas on the premises.

Other discoveries, and recent changes made in the oil regions, the writer proposes to point out in another article.

FACTS ABOUT PEAT.

We have received from Messrs. Leavitt & Hunnewell, of 49 Congress street, Boston, Mass., a large pamphlet of 120 pages, which is a compilation of facts in relation to peat as an article of fuel. The following selections will give a good idea of the contents, and may interest some of our readers:—

FORMATION OF PEAT BOGS.

It is found, on examination, to be composed of vegetal matters; generally mosses, and species of aquatic plants in different stages of decomposition: and from this circumstance, as well as from the general appearance of the localities where peat abounds, its formation is generally accounted for somewhat as follows:—

Where pools of water collect, the soil under which is retentive, the water, not being absorbed, stagnates, and, provided the surface evaporation is not great, forms a pond. Around the borders of this pond various kinds of aquatic plants—sedges, rushes, &c. —soon make their appearance, and, by reproduction, gradually creep in towards the center, until the whole surface becomes covered. In process of time, when several races of these have succeeded one another, and mud and slime have accumulated at the roots and around the decaying stems, a spongy mass results, which is well calculated for the propagation of mosses.

Under a constant supply of moisture, these various species thrive, continue to luxuriate, and, by progressive growth, ultimately give rise to a composition in every respect similar to that constituting the various peat-bogs.

That some such natural process has been the cause of the production of heat, appears from its composition, and the localities in which it is found. These are chiefly in the temperate zones, where evaporation is slow, and the atmosphere is generally more or less saturated with humidity.

It may be conceived, that, in the origin of these formations, the retention of the water, whether from rain or springs, in extensive basins, led at first to the development of vegetal growth in the manner above indicated; and that, the necessary moisture being supplied in abundance, the accumulation became so rapid, that ultimately the surface assumed the appearance of land; and, as decomposition proceeded, a degree of solidity was given to the mass, equal to the support of denser bodies, such as shrubby plants.

It would appear that this organic growth was rarely restricted to the original basin, but that, as it accumulated, it spread over adjacent land, which in time became a morass.

Evidence conclusive of this exists in the fact, that whole forests of almost every description, such as oaks, firs, ash, birch, yew, willow, &c., have been overwhelmed in its gradual but steady advancement, and are found in all positions at the bottom of peat-bogs.

Generally this formation is met with in climates of a moist nature, in level countries, where imperfect natural drainage exists; although it is found in considerable beds in upland districts.

In mountainous districts, in addition to the imperviousness of the rock to the moisture, the constant formation of clouds upon those elevated regions favors the growth of the mosses and plants, the decomposition of which contributes to the increase annually of these deposits.

In America, peat is rarely found in these elevated positions, and then only in small quantities: but in Great Britain, and on the Continent, the deposits are numerous and extensive; and, as a general thing, they are esteemed of superior quality for fuel. Instances of this kind are frequent in Ireland, Scotland, Northern Germany and Holland, while others are found high up the Alps, in the Vosges and in the Jura.

METHODS OF PREPARATION FOR FUEL.

Where peat-bogs abound, and the inhabitants make use of it as fuel for domestic purposes, the process of preparation is very simple, and has varied little, if any, for ages.

The surface layer, or turf, which contains the living plants and their roots in the natural state, is stripped off to the depth of six, nine, or twelve inches.

The material is then cut with a kind of spade known as the slane, which has a blade about eighteen inches long by six inches broad, with a wing on the side, bent upwards at right angles to the blade, so as to form, with the latter, two sides of a square.

With this the peat is cut in long square masses, and laid upon the sward, where it spontaneously loses its water, partly by infiltration into the soil, and partly by evaporation.

After these blocks are partially dried, having been turned at intervals so as to expose the different sides to the sun and air, they are found to be reduced very materially both in size and weight, and to have acquired a good degree of consistency. They are then piled or cobbled up in heaps on the sward, care being taken to dispose them in such manner as will admit of a free circulation of air through the mass; and, after remaining exposed in this manner for some weeks, they are generally removed to some airy place of shelter, where the process of drying may continue, and the fuel be convenient of access when the season arrives for its consumption.

Such is the mode generally adopted, both in this and other countries, when the peat is of sufficient density and elasticity to bear being so handled without breaking.

When, however, the material is brittle, and will not admit of being used in this way, it is dug out with ordinary spades and shovels, and all roots, sticks, stones, and such like bodies, picked out. It is then spread upon the greensward, or, in some cases, upon suitable ground covered with a layer of straw or hay, in a mass, to the depth of eight to eighteen inches, with a breadth of about four or five feet, and to such lengths as may suit the convenience of the laborers. In this condition it is brought to a homogeneous mixture by harrowing, raking, working over with hoes, spades, or other tools, or by the treading of men or animals, until it is of about the consistency of stiff mortar, when the surface and sides are smoothed, and it is left in this state to drain and dry.

After remaining for one, two, or three days, according to the weather, and acquiring a somewhat greater degree of consistency, it is rendered still more compact by beating the surface with shovels, spades, or paddles adapted for the purpose; and in some parts of Europe this is accomplished by treading, which is there mostly done by women and children, who attach flat boards, about six inches broad and twelve to fourteen inches long, to their feet.

By this time the peat has acquired such solidity that it will bear a person's weight upon it without sinking.

The surface is then marked off, or cut by the sharp edge of a board, or a large knife adapted for the purpose, to the depth of one or two inches, into squares; the sides of which are from three to six inches, according to the size desired for the fuel when it shall have been thoroughly dried, and ready for use.

In this condition it is left to dry; and, as evaporation proceeds, the squares contract, the cuttings gradually open down to the bottom, and the mass is separated into blocks of somewhat uniform size, standing on end, and of pyramidal form, the base being still quite moist, and covering nearly the whole surface, while the top, which has been most exposed to air and sun, has contracted, to nearly or quite one-quarter of its original size, and is dry and hard. The blocks are then turned once or twice, in order to give a more uniform exposure; and, at the expiration of a few days of good weather, they are in condition to be removed, and stored for use; care being taken however, that it be in a sheltered but airy location, and that it be not too closely packed; for, notwithstanding it may have the appearance of being quite dry, it will be found to have still retained a very considerable amount of water, and, if too closely packed, is liable to a fermentative process, which injures the quality, and has been known to raise the temperature so high as to cause spontaneous combustion.

RECENT PEAT.

Professor Lyell, in his "Principles of Geology," says,—"It is a curious and well-ascertained fact, that many of the mosses (bogs) of the North of Europe occupy the place of immense forests of pine and oak, which have, many of them, disappeared within the historical era. Such changes are brought about by the fall of trees, and the stagnation of water caused by their trunks and branches obstructing the free drainage of the atmospheric waters, and giving rise to a marsh. In a warm climate, such decayed timber would immediately be removed by insects or by putrefaction; but, in the cold temperature now prevailing in our latitudes, many examples are recorded of marshes originating in this source. Thus, in Mar Forest, in Aberdeenshire, large trunks of Scotch fir, which had fallen from age and decay, were soon immured in peat formed partly out of their perishing leaves and branches, and in part from the growth of other plants. We also learn that the overthrow of a forest by a storm, about the middle of the seventeenth century, gave rise to a peat-moss, near Lochbroom, in Ross-shire, where, in less than half a century after the fall of the trees, the inhabitants dug peat. Dr. Walker mentions a similar change, when, in the year 1756, the whole Wood of Drumlaurig was overset by the wind. Such events explain the occurrence, both in Britain and on the Continent, of mosses where the trees are all broken within two or three feet of the original surface, and where their trunks all lie in the same direction.

"Nothing is more common than the occurrence of buried trees at the bottom of the Irish peat-mosses, as also in most of those of England, France, and Holland; and they have been so often observed with parts of their trunks standing erect, and with their roots fixed to the sub-soil, that no doubt can be entertained of their having generally grown on the spot. They consist, for the most part, of the fir, the oak, and the birch. Where the sub-soil is clay, the remains of oak are the most abundant; where sand is the substratum, fir prevails.

"In the Marsh of Curragh, in the Isle of Man, vast trees are discovered standing firm on their roots, though at the depth of eighteen or twenty feet below the surface. The leaves and fruit of each species are frequently found immersed along with the parent trees; as, for example, the leaves and acorns of the oak, the cones and leaves of the fir, and the nuts of the hazel.

"The durability of pine-wood, which in the Scotch peat-mosses exceeds that of the birch and oak, is due to the great quantity of turpentine which it contains, and which is so abundant that the fir-wood from bogs is used by the country people, in parts of Scotland, in the place of candles. Such resinous plants, observes Dr. Macculloch, as fir, would produce a fatter coal than oak, because the resin itself is converted into bitumen.

"In Hatfield moss, which appears clearly to have been a forest eighteen hundred years ago, fir-trees have been found ninety feet long, and sold for masts

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and keels of ships: oaks have also been discovered there, above one hundred feet long. The dimensions of an oak from this moss are given in the Philosophical Transactions, No. 275, which must have been larger than any tree now existing in the British dominions.

"In the same moss of Hatfield, as well as in that of Kincardine and several others, Roman roads have been found, covered to the depth of eight feet by peat. All the coins, axes, arms, and other utensils found in British and French mosses, are also Roman; so that a considerable portion of the European peat-bogs are evidently not more ancient than the age of Julius Cæsar: nor can any vestiges of the ancient forest described by that general, along the line of the great Roman way in Britain, be discovered, except in the ruined trunks of trees in peat."

Correspondence

Proportion of Power Obtained by the Steam Engine.

MESSRS. EDITORS:—One of your correspondents seems to doubt if there be so much more efficiency in fuel than is obtained from it by the best steam engines. A few figures showing that it is so may, at the same time, suggest to him in what direction to apply his ingenuity to make the fuel more available. Chemists tell us that one pound of carbon completely burned furnishes 14,500 units of heat as they are termed, each of which will raise the temperature of one pound of water one degree, and also that each unit of heat may be converted into force sufficient to raise 772 pounds one foot high. The total energy of the pound of carbon will be 14,500 times 772, or 11,194,000 foot-pounds. A steam engine burning four pounds of coal per horse power per hour furnishes for each pound of coal 495,000 foot-pounds, since it raises 33,000 foot-pounds per minute, and one pound of coal lasts fifteen minutes.

Let us now examine the causes of this great difference in the result obtained in practice and the theoretical one. Charcoal contains about nine-tenths its weight of carbon, anthracite the same, and wood, if dry, one half as an average, so that the quality of the fuel may reduce the effect one half. Next, if the carbon be partly burned into carbonic oxide with six pounds of air to the pound of carbon, instead of being burned into carbonic acid with twelve pounds of air, the number of units of heat obtained from it is reduced from 14,500 down to 4,400.

Another cause of the difference is the quantity of unconsumed air passing through the furnace and thus lessening the volume of gases as it cools them, for if the pound of carbon burned with the proper quantity of air gives off its heat at an estimated intensity of 4,580°, it will have a temperature lowered to 2,440°, if twice as much air is admitted as is required for combustion. Besides these grounds of difference between theoretical and actual effect there is still another very important one. Carnot first pointed out the fact that the effect of an engine using heat depends upon the limits of temperature between which the engine works and not on the nature of the substance conveying the heat: and Rankine on "Prime Movers," page 304, remarks, that the difference between the whole heat absorbed and the whole expansive energy exerted depends on the initial and final conditions of the substance alone and not on the intermediate process. The true path for improvement, therefore, would seem to be in endeavoring to use water or some substance to which a given quantity of heat can be applied at a greater intensity or higher temperature than that at which it is used at present, and to expand it to the ordinary temperature of things around us. M.

Newburgh, N. Y., April 18, 1865.

Gas for Balloons.

MESSRS EDITORS:—Will you please inform me what kind of gas is the best for inflating balloons—the gas that will lift the greatest weight per cubic foot—and how such gas can be made. I would also like to know if gas would have the same lifting power in a hollow wooden or tin globe as it does in a balloon-shaped receptacle. I would also like to know what weight the lightest gas will lift per cubic foot.

S. S. R.

Petersburg, Ill., April 3, 1865.

[The lightest substance known is hydrogen gas. It is obtained by decomposing water; water being formed by the combination of oxygen and hydrogen in the proportion of 8 lbs. of oxygen to one of hydrogen. Chemical affinities generally change with the temperature. At ordinary temperatures there is no cheap substance for which oxygen has a stronger affinity than it has for hydrogen, but at a red heat it has a stronger affinity for iron, and at a white heat for carbon. Iron is therefore used for decomposing water on a small scale, and carbon on a large scale. If a gun barrel be filled with iron filings and heated red hot, and a stream of water or steam be passed through it, the water will be decomposed, the oxygen combining with the iron, and, the hydrogen being set free, when it takes the gaseous form. On page 280, Vol. III., SCIENTIFIC AMERICAN, new series, we published an illustration of an apparatus employed for decomposing water on a large scale by means of carbon.

Atmospheric air is 14½ times heavier than hydrogen, and 100 cubic inches of air weigh 31·01 grains; hence it would require about 14 cubic inches of hydrogen to raise 1 lb. in the air. The form of the balloon does not affect its buoyancy, but if the material be so heavy as to balance its whole lifting power, of course it will raise nothing else in addition.—EDS.

FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute on Tuesday afternoon, April 11, the President, N. C. Ely, Esq., in the chair.

From the several subjects discussed we select the following:

WHITE MAPLE SUGAR.

Solon Robinson presented from a correspondent a sample of maple sugar which was nearly as white as the best loaf sugar. A letter accompanying the sample stated that it was made by simply boiling down the sap slowly without any clarifying.

Prof. Mapes explained that if that was the case the result was due to the sugar having been crystalized from low-proof sirup—that is, sirup which was not boiled down to a very concentrated condition. This plan is not economical, as the sirup retains a large portion of the sugar in solution.

His practice of slow boiling is also wasteful. The longer sugar is kept at a high temperature in contact with the atmosphere, the larger the proportion of it which will absorb oxygen and be converted into molasses. The more rapidly sap can be evaporated, therefore, the larger the yield of sugar. The principal advantage of the vacuum pan is to prevent the conversion of the sugar into molasses by oxidation; this it does in two ways—by effecting very rapid evaporation, and by shielding the sirup from contact with the atmosphere.

CARBONIZED SHINGLES.

Professor Mapes exhibited some shingles manufactured by Tenney & Bennett, of Hubbardston, Mass., and explained that they were partially carbonized by passing them between red-hot rollers; the object being to render them more durable. The bearings of one roller are pressed down by springs so as to equalize the pressure throughout the length of the shingle. The expense of the operation was stated to be about one dollar per thousand.

THE CANKER WORM.

Dr. Trimble read a letter from a correspondent in relation to some insects which were inclosed, and stated that they were specimens of the male and female moth of the canker worm. He remarked, further, that this is the insect which he had spoken of as having been found in the crop of the cedar bird. Unlike other span worms, the chrysalis of the canker worm passes the winter in the ground, and the female being wingless her ascent of the tree is effectually prevented by surrounding the trunk with some impassable obstacle.

BLACK KNOTS ON PLUM TREES.

Dr. Trimble also replied to the question of a correspondent in relation to the cause and remedy of the black knots on the plum tree. They are caused by an insect of which there is a large class—the cynips. The effectual remedy is to cut them off when they are first formed, in the month of June. Some people cut them off in the winter or spring, but that has no effect in destroying the insect. These knots are used sometimes by the curculio as a deposit for her eggs before the fruit is sufficiently grown for the purpose. I have hatched numbers of curculios from eggs in these knots.

LIGHT MILK BETTER THAN HEAVY.

An article was read from some French *savant* on a new grass, in which it was stated that the grass made better milk than lucern, as shown by the hydrometer, the milk from the new grass being of greater specific gravity than that made from lucern.

Professer Mapes remarked that the richer milk is in cream the lower its specific gravity, cream being lighter than water.

Several other subjects were discussed but none of special interest for our columns.

Effect of Saleratus on the Teeth.

A correspondent of the *Dental Quarterly* makes the following statement in regard to the effect of saleratus on teeth:—

"I do not think it is generally known how much of this article is used in the community. To satisfy myself, I took the trouble to ask each of the grocers in Portsmouth, how much saleratus and cream of tartar they sold in a year, and the amount of all was—*saleratus*, 50,198 lbs.; *cream of tartar*, 15,100 lbs. Thus over twenty-five tons of the former, and more than seven of the latter, are probably used in Portsmouth and vicinity in a year! Portsmouth has 10,000 inhabitants.

"I subjected a handful of teeth to a strong and warm solution of saleratus, for about fourteen days; the consequence was, they became as brittle as burnt bones. The same time I subjected some to a solution of cream of tartar; the consequence was not the same, but equally, if not more injurious. This also may be called an extreme case, but subjecting them to common water for *fourteen months* would have but little or no effect on them. The saleratus removes the gelatine, the cream of tartar removes the lime, the two principal ingredients of the teeth; and between the two evils the teeth stand a poor chance, and hence the result."

Hunt's Feed Cutter.

A good feed cutter is a very essential thing on a farm, or, indeed, where cattle of any kind are kept. For some time past one has been standing in our office, which is pronounced by persons using it, whose testimonials have been shown us, to be a perfect thing. It is entirely self-operating, and can be worked by boys or persons of moderate strength with great efficiency. This machine is known as "Hunt's Hoosier Feed Cutter," and an advertisement of it can be seen in the last number of the SCIENTIFIC AMERICAN. A machine can also be seen at this office.

THIRD DENTITION.—In a letter from Brazil to the *Dublin Medical Press*, Dr. Richard de Gumbleton Daunt states that "in this city, Campinas, San Paulo, exists a person (a mulatto girl, with a severe chronic cough, a chronic discharge from the ear, with occasional severe ear ache, but not rachitic) in whom the second set of teeth were shed during convalescence from a fever at the age of 14, and were succeeded by a third dentition, which resulted in as fine and perfect a set of teeth as may anywhere be seen."

EXPORT OF FISH BAIT.—A Boston paper states that the schooner, *M. C. Rowe*, is loading at Gloucester a cargo of some six hundred barrels haddock spawn for France direct. They are used by the French fishermen in the Sardine fishery for bait, and a small number of barrels have been shipped from Boston. It is stated that this is the first fishing schooner from the United States direct with a cargo for the fishermen of France.

As cold articles taken into the stomach, are warmed by the circulation of the blood, and as muscular exercise increases the circulation in every part, it should always be used when any chill is felt at the stomach after taking anything cold.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Petroleum Elevators.—This invention is embraced in two separate Letters Patents, and relates more particularly to apparatuses for the raising of petroleum from deep wells, although it can be adapted to the raising of liquids generally from great depths or to great heights, in which an air-blast is used, and consists principally in a peculiar construction and arrangement of the air-nozzle or orifice through which the air issues to the petroleum in the well, whereby the oil can come in contact with both the exterior and interior surfaces of the air blast, thus greatly increasing its suction and consequently drawing up and discharging a proportionally greater quantity of oil at the top of the well. S. F. Schoonmaker is the inventor, who can be addressed at the Astor House, New York City.

Smoking Pipe.—Mr. L. C. Walker, of 21 South Calvert street, Baltimore, Md., has obtained a patent through the Scientific American Patent Agency, for quite a noticeable improvement in smoking pipes. One feature of the invention consists in breaking the current of smoke in passing from the bowl to the mouth, allowing more time for the nicotine, an injurious element of the smoke, to be deposited and received into the saliva cup. Another point of the invention is in having the stem closed at the end and the smoke passage to lead into the mouth at the upper side of the stem, thus restricting the tendency of the saliva from passing into the mouth of the smoker. As a further guard against this latter evil, a smoke bag or sack is formed in the stem just below the egress opening for the smoke. The patent is dated March 21, 1865.

Baling Press.—This invention relates to a new and improved press of that class designed for compressing substances, such as cotton, hay, hops, etc., for baling, and consists in the employment of toggles, arranged and applied to the press in such a manner as to afford a very compact and efficient mechanism for operating the follower, and compressing the substance within the press-box. The invention for these consists in novel and improved fastenings for the side and top doors of the press, while the same may be very readily secured in a closed state, and also very readily opened. George C. Paine, of San Francisco, Cal., is the inventor, and the Patent bears date April 4, 1865.

SPECIAL NOTICES.

AARON PALMER, Brockport, N. Y., and Stephen G. Williams, Janesville, Wis., have petitioned for the extension of a patent granted to them on the 1st day of July, 1851, for improvements in harvesting machines.

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Parties wishing to oppose the above extensions must appear and show cause on the 19th day of June next, at 12 o'clock, M., when the petitions will be heard.

DURING the starvation of an animal, all its secretions are still formed; a consideration which proves that the productions of urine, bile, and other such bodies are, in reality, connected with the destructive processes going on in the animal system. These processes of decay originate in the action of oxygen admitted by the process of respiration.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening April 13, 1865, the President, S. D. Tillman, Esq., in the chair.

CEMENT PIPE FOR SEWERS.

This was announced as the subject of the evening. Mounted on a table in the room were three pieces of pipe twelve inches in diameter and each piece about four feet in length; they were from the manufactury of Knight & Woodward, No. 10 Reade street, Brooklyn. This firm have made large quantities of this pipe for the sewers of Brooklyn.

Mr. Knight explained the process of manufacture. The materials are one part Rosendale water cement to two parts clean sand. These are thoroughly mixed together dry, then moistened with water into a stiff mortar, and immediately molded into pipe. The core is iron smoothly polished upon the outside, and the exterior mold is of iron polished upon the inner surface. The mortar hardens, or "sets" almost instantly, but it is kept in a damp place a fortnight before it is placed in the ground for use. The pipe is manufactured in sizes ranging from 3 inches to 24 inches in diameter, the prices being from 14 cents to $1·30 per lineal foot. More than 50 miles of the 12-inch pipe have been laid in the sewers of Brooklyn, and many miles of other sizes.

Mr. Woodward read some extracts from the report of an English commission appointed to examine the sewerage system of London, showing the conclusion of the commission that small pipes are less likely to be obstructed than large sewers which are several times more expensive.

Mr. Enos Stevens gave the results of some experiments that he had tried to ascertain the descent required for water to carry along stones and other substances. He found that in a V-shaped trough, after it had become smooth, a descent of 1 foot in 58 was sufficient to wash away all obstructions.

After furthur discussion at considerable length the subject of comb-making was selected for the next evening and the Association adjourned.

Curious Trees.

The Adansonia, or Baobab Tree, is the giant of the vegetable world. We have the record of one whose trunk measured one hundred and four feet in circumference. The hight of this tree does not exceed fifty or sixty feet, while the branches are about the same length, and when seen from a distance, the hemispherical cap of foliage almost resembles a forest. A full-grown Adansonia, with its deep green leaves, and large snowy blossoms is a magnificent sight. It attains to a patriarchal age, and it is said there are trees now living more than two thousand years old. It is a native of Senegal and other parts of Western Africa.

The Dragon Tree—another gigantic tropical growth—has ordinarily an erect trunk of not more than twelve or fourteen feet in hight, which divides into short branches, each terminating in an expanded tuft of pointed, sword-shaped leaves. There was one of these trees, destroyed by a tempest some forty years ago, in the island of Teneriffe, which measured forty-five feet in circumference, and nearly sixty feet in hight, and which was supposed to be one of the oldest living inhabitants of our globe.

The Courbarils, of Brazil, are described as having trunks more than eighty feet in circumference at the base, and sixty feet where the boles become cylindrical. They are said to resemble living rocks more than trees, for it is only on the pinnacle of their bare and naked bark that foliage can be discovered, and that at such a distance from the eye that the forms of the leaves can not be distinctly seen.

There was, and for anything we know, there is still, a cypress at Chapultepec, in Mexico, whose trunk measured one hundred and eighteen feet in circumference. In Buckinghamshire, England, there is a famous yew which has a diameter of about twenty-seven feet.

The Norfolk pine, or Kawri of the New Zealanders, attains a huge size. This majestic tree grows to the hight of from one hundred and sixty to two hundred and thirty feet. One is spoken of which measured seventy-five feet round the base.

Among gigantic flowers and leaves, we have the Victoria Regia, a water lily.

The Rafflesia Arnoldi is still larger. This colossal parasite is a native of Sumatra, growing on a kind of vine, and having no true stem or leaves. The petals of the flower, as observed by the discoverer, were five in number, of a dull brick red, and covered with yellowish white spots. They and the nectary were from one-fourth to three-fourths of an inch in thickness. The flower measured a full yard across, and the nectary was of the capacity of six quarts, while the weight of the whole was at least fifteen pounds.—*Horticulturist.*

Profits of Fruit Growing.

Looking carefully into the matter of the profit realized from all descriptions of fruit growing, and running over only two or three authorities on the subject, multitudes of instances are to be found where extraordinary gains are annually realized without apparent care or skill. Some years ago there was an orchard of 70 Mayduke cherry trees, a few miles below Philadelphia, the daily sales from which during the season amounted to $80. A single Washington plum tree, in a city garden, has been known to yield six bushels of fruit, worth $10 per bushel. A vineyard some sixteen miles from Philadelphia, occupying three-eighth of an acre, has produced $300, when the grapes sold only for eight cents a pound, or at the rate of $800 per acre. A single Catawba vine, in the same neighborhood, has produced ten bushels, worth $40 at market prices.

No matter what fruit is examined, the same results are found to occur. A row of common gooseberries a hundred yards long have realized $40. Two superior Apricot trees have produced $100 worth of fruit in a season. There are Onondaga pear trees in New Jersey gardens which yield fruit enough, every season, to net their owners $30 per tree.

Treatment of Fowls.

The *Country Gentleman* has a correspondent who writes as follows:—The best English chemists have pronounced kerosene oil to be the most effectual and harmless remedy known for the destruction of parasites upon animals and fowls. I have proved it by experience; the lice die at once and their extermination is almost certain. Two days' confinement is generally sufficient to overcome the incubating fever. I think it is by far the best and most humane remedy known. A very valuable remedy for sick fowls is jalap. I have often tried it, and been astonished at the rapidity of their recovery from disease; it is very efficacious in many diseases, and its timely administration would save many a valuable fowl; fourteen to sixteen grains made into a pill is a dose for a good sized fowl.

STAMP ALL ASSIGNMENTS.—We would call the attention of all corporations, stock companies and banking institutions to the fact that the Commissioner of Internal Revenue has lately decided that "an assignment of stock made by the owner which passes the title to the purchaser, whether made upon the bonds of the corporation or upon the certificate, is subject to stamp duty of five (5) cents." No general publicity having been given to this decision, the corporations, in consequence, have failed to comply with the law in this respect, the failure of which makes the transfer invalid.

HARDENING OF BURNT CLAY.—At Rivieres, France, they make tiles and bricks of a sandy clay which contains 32 per cent of chalk. When first burnt they are so tender that, unless they are carefully handled, they fall to pieces. As soon, however, as they are cold enough to touch, they are quickly removed from the furnace and carefully stacked. They are then soused with water, by the action of which they are so hardened that they may be used the next day for building. This fact is, perhaps, easily capable of a chemical explanation, and brickmakers may be able to gather a hint from it.—*Chemical News.*

GOLD may be purified from silver by quartation; that is, fusing it with three times its weight of silver, and then acting on the mass with nitric acid; the gold is left as a dark powder, and may be fused after being washed.

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Improved Double-edging Machine.

This machine is intended to be used in mills where large quantities of lumber require to be edged parallel, or split into parallel strips for flooring or fencing boards. Its construction and operation is such that much time and labor is saved by it, and lumber produced with neat and parallel edges. The machine is provided with two saws on one arbor; one of the saws, A (Fig. 2), is attached to a stationary collar, B (Fig. 1), and the other saw is attached to a sliding collar or sleeve, C, which is provided with a feather or key that fits in a groove running the length of the arbor between bearings. The saws are adjusted in an instant to any desired width by operating the hand lever, D, which moves the sleeve and saw, by means of the rod and lever, E; this operates a sliding arm, F (Fig. 2), under the front fluted roller, G. The lumber is fed through the machine by means of the several fluted rollers, and the press rollers, I, mounted on the roller caps or frames, J, which are jointed to the curved side plates of the cast frame, K. The press rollers can be elevated or lowered at pleasure to suit any thickness of lumber by operating the long foot lever, L (Fig. 2), which carries or moves the two-branched lifting jack, M, on which rest the two frames beforementioned. This arrangement always insures a parallel position of press rollers with the feed rollers. It is an important detail, as it produces an equal pressure on either edge of the board, thereby feeding the lumber through straight, which cannot be done where one end of the rollers is allowed to raise and fall independent of the other. The feed rollers are put in motion from a small belt pulley on the end of the saw arbor (Fig. 1), and the belt, N, which operates the small friction pinion attached to the belt pulley, O. This friction pinion runs between the two flanges on the large pulley, P, giving motion to the fluted feed rollers, G; motion is also imparted to the feed roller or pulley, Q, by the belt, R, driven by the large friction wheel, S. The pulley, O, is mounted on a rock shaft, T, and by operating the lever, U, the friction pinion on O is made to impinge either against the inside or outside friction rim, at pleasure. This arrangement admits of first feeding the lumber through to take off the edges of it, and then by operating the hand lever, U, reverses the motion of the feed rollers, and thus brings the lumber back again for a second operation of sawing into strips if required. All the working parts of the machine are neatly and substantially built of iron and mounted on the iron frame, O, which is simply bolted down to the wood frame or table, W. X is one of several wooden rollers which should be carefully adjusted into line with the iron-fluted rollers.

This machine was patented Aug. 12, 1862; for further information address the patentees, Hayes & Newman, Unadilla, Otsego Co., N. Y.

Fig. 1.

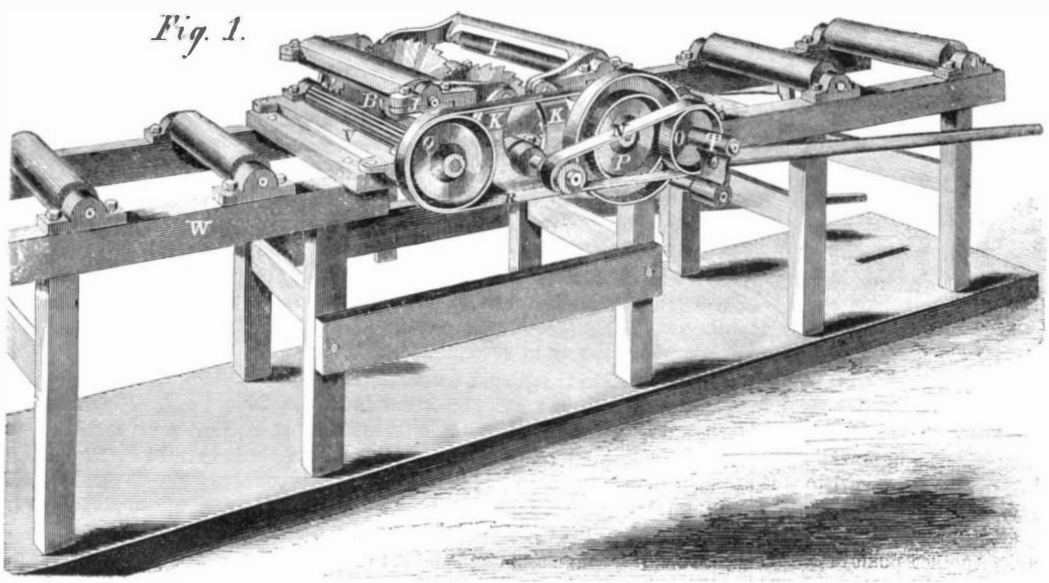
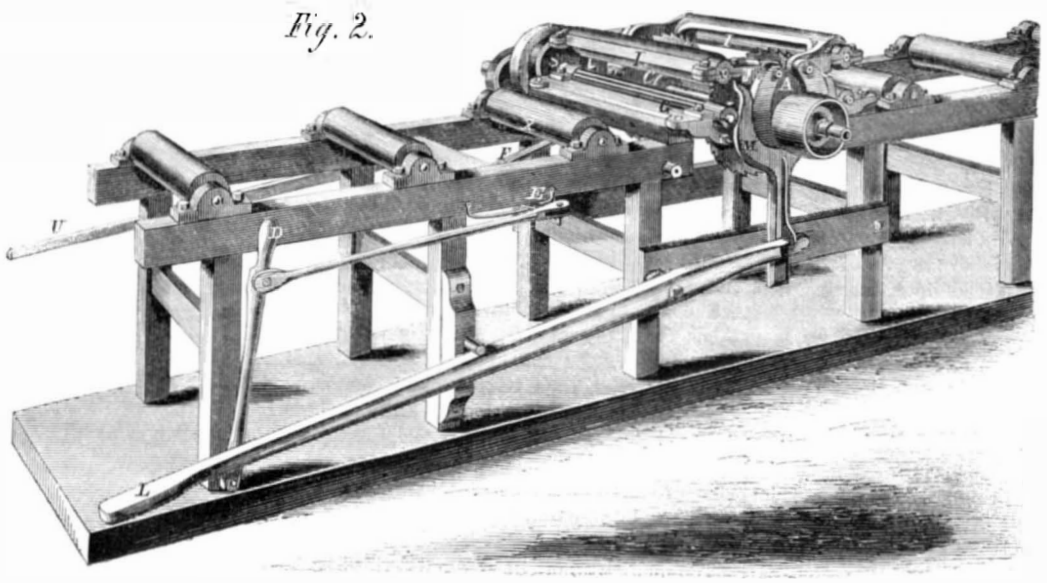


Fig. 2.



HAYES & NEWMAN'S PARALLEL DOUBLE-EDGING MACHINE.

WESTFIELD, Mass. has been for a long time famous for the extent of its whip manufactories. The business was commenced there twenty years ago and there are now forty-two factories.

WONDERFUL SKILL IN BILLIARDS.

Many curious illustrations of the composition and resolution of forces can be seen in the movements of ivory spheres on a billiard table. It is found that in the rebound of a ball from a plane, the angle of reflection is not always equal to the angle of incidence, but that the relation of these angles depends on a number of circumstances.

On the evening of Tuesday, April 11th, several hundred persons, including a number of ladies, were gathered in the large hall of the Cooper Institute to witness a display of skill in billiards by M. Carme, who had recently arrived from France to enter the lists in contest with the eminent billiard players of this country.

The table used was a small carom, manufactured by Phelan & Collander for the occasion, having been commenced and completed on the same day of the exhibition.

Some of the shots made by the Professor, his *masse* shots especially, were exceedingly well executed, and evinced remarkable skill; but for some reason he did not seem to possess that degree of confidence in the result of his endeavors which always characterized the celebrated Berger's playing, and consequently he was too much given to *misses* to make the entertainment in the highest degree enjoyable. The management was bad on the opening evening, but will no doubt be improved on subsequent occasions. On the cards of invitation it was stated that seats would be reserved for ladies, but on our arrival, a few minutes past 8 o'clock, we failed to discover any vacant ones, although the number of ladies present was not overwhelming. A challenge to play with any one in America was read at the close of the exhibition, but the specified conditions as to size of table, balls, etc., may not meet the approbation of our American players. We should like to see M. Carme play with Kavanagh the American game, on a full-sized Phelan table, and we hope an opportunity will be given New Yorkers to witness such a contest.

ARSENIC POISON.

An old and respected correspondent sends us this note:—

"It may do good to some of your many thousands of readers, to remind them that a teaspoonful of common copperas, dissolved in a small tumbler of water, with another teaspoonful of common magnesia added, and drank, is a perfect antidote to arsenic taken into the stomach. Of course it will not repair any damage already done to tissues, but it will almost instantly check and prevent further harm. I leave you to state, if you will, what the reaction in the stomach will be. I suppose physicians would recommend an emetic within half an hour."

The importance of the subject of this communication induces us to publish it, in the hope of drawing out the truth in relation to the remedy proposed. Oxide of iron is a well known antidote for arsenic poison. If magnesia is added to a solution of copperas, which is sulphate of iron, the copperas is decomposed, the sulphuric acid combining with the magnesia and the oxide of iron being set free. It might therefore seem plausible that the plan suggested would be effectual.

But the form in which arsenic is most commonly used is that of arsenious acid, As O_3, and the antidote is the sesquioxide of iron, $Fe_2 O_3$. The iron gives up a portion of its oxygen which combines with the arsenious acid, converting it into arsenic acid, As O_5, and this combines with the iron, forming a sub-arseniate of the protoxide of iron, 4 Fe O, As O_5. In the plan proposed by our correspondent we do not see where the oxygen is to come from to convert the arsenious into arsenic acid. There may be, however, some reaction between these substances of which we are ignorant. If R.H.A. or any other correspondent has facts which settle the question, we should be pleased to hear from him. With our present information we are more disposed to caution people against trusting to this remedy than we are to recommend its use.

THE sewing-machine inventor, James E. A. Gibbs, who went South in an early stage of the rebellion, is said to have been the chief of the torpedo corps organized by the rebel authorities, and the efficiency of those infernal machines is attributed to his ingenuity and mechanical skill. He is a native of Pocahontas County, Virginia.

A. BABCOCK, Brunson Harbor, Mich., wishes to obtain hand looms and plantation spinning machines for farmers' use.

A THREE-CENT copper coin has been ordered, and by law to be a legal-tender, up to sixty cents.

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VOL. XII. NO. 17...[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, APRIL 22, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

*Sweeney's Rotary Rock Borer and Tunneling Machine	255	Recent American Patents	261
Glass Trade in the West	255	Special Notices	261
The Work of Different Countries	256	Polytechnic Association	261
Paraffine	256	Curious Trees	261
Production of Ammonia	256	Profits of Fruit Growing	261
Rebel Abatis at Petersburg	256	Treatment of Fowls	261
The Three Sand Rocks	256	*Hayes & Newman's Parallel Double-edging Machine	262
The English Lock-Out	256	Wonderful Skill in Billiards	262
A New Kind of Electrifying Machine	257	Arsenic Poison	262
Aluminum Bronze for Coin	257	Our Calamity	263
The Cornish Engine Deteriorating	257	Getting Potash Directly from the Rock	263
Directions for Making Blacking	257	McCulloch on California Currency	263
A Curious Clock	257	The Good Time Coming	263
Plants from Cuttings	257	Model Houses	263
The Oil Regions of Pennsylvania	258	Gunpowder Extraordinary	264
FactsAboutPeat	259	A True Hero	264
Proportion of Power Obtained by the Steam Engine	260	Horse Power	264
Gas for Balloons	260	Atlantic Telegraph	264
Farmers' Club	260	Books and Publications	265
Effect of Saleratus on the Teeth	260	A Successful Commander	265
Hunt's Feed Cutter	260	Patent Claims	265, 266, 267
		Notes and Queries	268
		*Toshach's Car Spring	270
		A Large Filter	270
		*A Neat Thing	270

OUR CALAMITY.

An appalling and overwhelming calamity has befallen the nation. The Chief Magistrate has been stricken down by the hand of an assassin; and, as one man, the people are aghast at the magnitude of their loss. In the flood tide of victory, in the fullness of the joy which our successes in overthrowing the rebellion warranted, a pall drops upon the flag, ashes are strewn upon the laurel, the jubilant shouts are changed to cries of mourning.

It is too early to foresee the political results of this awful crime. Our hearts are sick unto death at the sudden revulsion which has taken place in public affairs. Though the hand of justice may not close over the offender presently, the execrations of all right-minded men will forever settle upon the infamous cause of it. In His own hour, the All-seeing God will exact punishment therefor.

The deep grief which sits upon the faces of the people, shows how dear to them was the simple, honest, upright man, who so lately guided us. Wise in judgment, inflexible in decision, magnanimous to his enemies, pure in private as in public life, history will record no brighter name upon its pages than that of ABRAHAM LINCOLN.

GETTING POTASH DIRECTLY FROM THE ROCK.

Potash is worth ten cents per pound, and unlimited quantities of it are distributed through all our granite rocks. Among the patents issued from the United States Patent Office during the week ending March 21, we see there was one to Frederick Oldfield Ward, of London, England, of a process for extracting potassa from the alkaline silicates in which it occurs.

Granite is composed of three minerals, mica, quartz and feldspar; it is in the feldspar that potassa occurs. Feldspar, besides being one of the components of granite, is found also in many places in this country and Europe in large masses or beds by itself. It contains generally about 16 per cent of potassa, and many efforts have been made to devise some economical process for extracting this potassa.

The potash in feldspar is combined with silica, forming a silicate of potassa, an insoluble salt. Silica has a very strong affinity for fluorine, and judging from Mr. Ward's claim we infer that his plan is to separate the silica from the potassa in feldspar by means of this substance. The cheapest source of fluorine is fluor-spar, a beautiful mineral that is found in considerable quantities in New England, New York, Illinois, and other parts of the country. It is a fluoride of calcium, being a combination of the two elements, fluorine and the metal calcium.

If fluor-spar and feldspar were finely pulverized, mixed together, and highly heated, both the fluor spar and the silicate of potash in the feldspar would be decomposed; the fluorine and the silicon of the silica would combine to form fluosilicic acid, which would pass off as a gas; the calcium would be oxydized, forming lime: and a mechanical mixture of lime and potash would remain.

By the addition of water, the potash would be dissolved, and if a portion of the lime were dissolved also, this could readily be removed by passing carbonic acid gas into the solution; thus a solution of pure potash would be obtained. From the phraseology of the claim we infer that this is Mr. Ward's process, and we do not see why it should not be economical and practical. If it is, the invention is one of great value.

In some deposits of feldspar a portion of the potash is displaced by soda, and in this case both alkalies are extracted by the process.

McCULLOCH ON CALIFORNIA CURRENCY.

It is stated in the papers that Secretary McCulloch has written a letter, giving his opinion that if California had adopted a mixed currency of paper and gold in place of her pure metallic currency, it would have materially increased her wealth, through its effect in lowering the rate of interest.

We have no doubt of the superior intellect of Mr. McCulloch, and of his eminent ability as a practical banker. We have entire confidence also that he will make an excellent Secretary of the Treasury, provided he does not fall into any unsound theories in relation to the currency.

But if he has written the letter attributed to him, it seems to us that he fails to draw clearly the distinction between currency and capital.

In California, as in other communities, the currency forms not more than two or three per cent of the aggregate capital. That which is called money at interest is really not money, but steam engines, stamping mills, gold-washers, steamboats, stocks of merchandise, and capital in various other forms. It is the relation of the supply and demand of this aggregate capital that determines the rate of interest.

When Mr. McCulloch was president of the State Bank of Indiana did it ever occur to him to consider what it was that made up the capital of that bank? The assets of the bank, to the amount of the whole capital and a considerable portion of the deposits and circulation, were in the form of bills receivable. These were pieces of paper, some of them worthless, and some of value to the amount of thousands of dollars. What made these valuable? The fact that the signers were in possession of money equal to their face? Not at all. Very few of the business men whose notes were discounted by the bank held money on hand to the amount of their debts, but all of them whose notes were good had capital in merchandise or other forms of personal property to the full amount of their debts. In ordinary times and in a normal condition of trade, the money which banks have on hand is due to depositors, belongs in fact to men who have left it with the bank for safe keeping, and every dollar of the capital of the bank exists in the form of merchandise. At the times when the capital is hired and when it is repaid, it exists in the form of currency, money being employed in these as in other exchanges of value; but during most of the time that it is loaned it exists in the form of merchandise.

Had California adopted a currency of mixed paper and gold the paper would have displaced gold to an amount nearly equal to its own volume. The shipment of this gold would have brought in cloth, steam engines, canned fruit, and other merchandise in exchange. A portion of this would have been consumed in more luxurious living, and a portion would have been added to the capital of the community. But had the whole been saved and added to the capital, it would not have increased the aggregate capital to the extent of one per cent, and its effect upon the rate of interest would not have amounted to the one hundredth part of one per cent.

THE GOOD TIME COMING.

The "good time," which tramping minstrels have been promising so long seems really coming at last. Gold falls rapidly daily, and as the political prospects of this sorely tried country brighten our foreign relations improve commensurately. By the surrender of Lee the Confederacy is left without an army to defend it, and from this time forward we may expect a new order of things.

The *Richmond Whig* says what we have before asserted that "Improvement, renovation and reconstruction must assuredly follow in the wake of the Union armies, in things political, as well as things material. A strong force of laborers is to be at once put at work on the broken points of the Richmond, Fredericksburg, Aquia Creek and Potomac Railroad, and its completion, which will occur within the next few weeks, will put Richmond in rail communication with the capital of the United States. Again the iron bands, broken by the ruthless hand of war, welded again, will once more re-unite a divided people in bonds too strong to be put asunder. The river obstructions are, we believe, being removed as expeditiously as possible, and forty-eight hours will not elapse, we opine, before we hear of steamers at Rocketts, direct from New York, Philadelphia and Baltimore. The river at City Point is filled with a sutler's fleet awaiting permits to enable them to bring their supplies up to Richmond."

In that portion of our beloved country uprooted by the chastening hand of the Goverment in reclaiming its own, there lies a fertile field for commerce which will speedily be worked. Lands that slovenly, enforced labor have impoverished, shall grow crops fabulous in that olden time when the thong was the master and no hope of remuneration visited the minds of those who tilled the soil. Factories shall rise, and hands to fill them, work them, and brains to manage them will be required and not found wanting, and the future seems bright with promise for mechanical pursuits, as the armies of the rebels fray out into ragged, purposeless crowds of unemployed men.

These it is the province of labor to call into useful activity again, and the hands that held the saber shall wield a different steel to far better purpose. Labor shall settle the differences, and hostilities be quenched in the desire to obtain homes and comforts for wives and children now destitute. Thus will the rank and file of the two armies once opposed to each other become assimilated in the bonds of good feeling and dissensions between sections which the political press affect to deplore will be unknown. Thus, then, is "the good time coming" at last.

MODEL HOUSES.

There is nothing which New York is more deficient in than dwellings, or homes, for people of moderate means at a reasonable rent. Our avenues are lined with costly brown stone residences, the rent of which would be a handsome income for most persons, and in the lower quarters of the city there are blocks of buildings which are let and sub-let to all comers indiscriminately.

It is the mean between these two that is wanting. To any one who has not lost all sense of the ordinary proprieties of life, who still retains sufficient self respect to hate dirt and uncleanliness, of whatever name and nature, these tenement houses are simply untenable. Rowdy boys cluster around the door and steps, clatter up and down stairs at all hours of the day and night; these, together with other nuisances affect the well being of those who desire to lead quiet lives.

Some of the houses alluded to were not built for the occupancy of more than one family, and the arrangement of them is faulty and unhealthy to the last degree. We need not hope for any abatement of taxes for years to come. On the contrary they will, doubtless, increase; real estate, therefore, will be

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high, and whole dwellings are not to be hoped for by persons of small means. There is no reason, however, why houses, varying from two to four stories in hight should not be constructed with a view to the accommodation of gentlemen's families, or those, who, respecting themselves, regard their neighbor's comfort and convenience also.

Houses built in "flats," so termed, are common in Europe where taxes are great and many persons of the highest social culture and standing occupy said flats to their very great convenience. All the necessary fixtures and appurtenances belonging to housekeeping may be found on one floor, and within the limits of 100 by 25 feet, or less, according to rent, and the tenant is as much at home, as private and safe from inquisitive neighbors as any one can be under such circumstances. Dumb waiters for raising coal from the cellar, places for storing the odds and ends of housekeeping, laundries for getting up the linen, airy, well ventilated rooms for living, and above all sleeping in, kitchen with hot and cold water, bath room, in short the usual appliances of civilized life should be the distinguishing features of such houses and the demand for them is yearly increasing.

There are a few houses now in this city on such plans and they are secured immediately as soon as vacated; palpable proof of the estimation they are held in. An improvement on the plan of each tenant purchasing his own coal would be a heater in the cellar where, for a stipulated price the landlord could in cold weather heat the premises night and day with great economy; fuel for cooking alone would then be necessary.

Hundreds, yes thousands of our citizens are annually flying to the suburbs from the simple impossibility of living longer in the city under ordinary circumstances, and sooner or later such buildings as we have described will be indispensable in this and other large cities.

GUNPOWDER EXTRAORDINARY.

Under this head the *Mechanics' Magazine* describes the process of manufacturing a new kind of gunpowder which has been patented in the principal countries of Europe, by Captain Schultze, of the Prussian artillery. Our cotemporary says that the new article, "while being nearly four times as powerful as gunpowder, costs, weight for weight, considerably less than gunpowder, and can be used in precisely the same way as gunpowder, its substitution for gunpowder requiring no new method or precaution beyond that of using of the new powder only one-fourth as much as of the old.

"To this it must be added that Capt. Schultze's powder does not foul the guns in which it is used; that the products of its combustion are perfectly transparent gases, offensive neither to the eyes nor to the lungs, and lighter than atmospheric air, so that they soon pass away; and that its manufacture is much safer than that either of gunpowder or guncotton.

"The first process in the manufacture of the new powder is to cut some wood—we are told that any kind will do, but that the harder it is the stronger it will be—into sheets or veneers, of a thickness equal to the diameter which it is desired that the grains of the powder to be produced shall have. For powder to be used for ordinary small arms, Capt. Schultze recommends that the sheets be about one-sixteenth of an inch thick. These sheets, whatever their thickness, are cut up by a punching apparatus into little cylinders, of diameter slightly less than the thickness of the sheets from which they are cut. The cylinders thus obtained constitute, eventually, the grains of the new powder, which is thus granulated at the beginning, instead of, like the ordinary gunpowder, at the end, of its process of manufacture. In order to remove from these cylinders, or grains, all their constituents other than cellulose, they are boiled for about eight hours, in a copper kettle, in a strong solution of carbonate of soda, the solution being changed as often as it becomes discolored; they are then kept in a stream of running water for twenty-four hours; and are next steeped for about two or three hours, being constantly stirred all the time, in a solution either of chloride of lime or of chlorine gas. They are then well washed, first in cold water and afterwards in hot; and are finally kept a second time for twenty-four hours in pure cold running water. They are then submitted for six hours to the action of a mixture of forty parts by weight of concentrated nitric acid with a hundred parts by weight of concentrated sulphuric acid, one part by weight of the grains being placed with seventeen parts by weight of the mixed acids in an iron vessel, which should either be placed in a powerful refrigerating mixture, or have cold water constantly circulating around it. At the end of six hours the grains are taken out, and carefully drained from all adhering acid. They are then kept in cool fresh running water for two or three days, then boiled in a weak solution of carbonate of soda, then exposed to running water again for twenty-four hours, and then dried as completely as possible. Captain Schultze states—somewhat to our surprise—that up to this point the grains are not explosive, and that this drying operation therefore involves no danger. When fully dried, the grains are ready for the last operation but one, which consists in steeping them for ten minutes in a solution of some salt or salts containing oxygen and nitrogen. Captain Schultze prefers nitrate of potash (saltpetre), or nitrate of barytes, or, what he finds is better still, a mixture of both. He recommends for every hundred parts by weight of the grains, two hundred and twenty parts of water having dissolved in it twenty-seven and a half parts of nitrate of potash and seven and a half parts of nitrate of barytes. The temperature of the solution should be 112 deg. Fah. After having been stirred about in this solution for ten minutes, the grains have only to be taken out and drained, and then dried. The drying must be done, this time, in a chamber kept at a temperature of from 90 to 112 deg. Fah., and will occupy about eighteen hours."

Cotton fiber is almost pure cellulose, and wood fiber is mostly cellulose, but containing gums and other substances. Cellulose is composed of carbon, hydrogen and oxygen in the proportion of 6 atoms of carbon, 10 of hydrogen, and 5 of oxygen, C_6, H_{10}, O_5. As it takes one atom of oxygen to burn one of hydrogen to water, HO, and two of oxygen to burn one of carbon to carbonic acid, CO_2, it is plain that 22 atoms of oxygen would be required to effect the complete combustion of the carbon and hydrogen in one atom of the celloluse, 17 more than is contained in the cellulose. To burn cotton or wood, therefore, a supply of oxygen must be furnished from the atmosphere or some other source. In gunpowder this is not required, as the saltpeter contains sufficient oxygen to effect the combustion of the sulphur and carbon. Gunpowder, therefore, will burn in a close vessel excluded from the air, while cotton or wood would be extinguished.

Guncotton is made by treating the fiber of cellulose with nitric acid, NO_5; the acid loses, 1 atom of oxygen, becoming NO_4, and this enters into the compound, displacing a portion of the hydrogen. The proportion of hydrogen displaced depends upon the mode of treatment. In photographic guncotton the quantity of oxygen carried into the compounds is not sufficient to effect the complete combustion of the hydrogen and carbon, consequently, if photographic guncotton be set on fire in a close vessel, only a portion of it will be burned. By Baron Von Lenk's treatment the quantity of oxygen introduced is sufficient to complete the combustion, hence the explosive quality of his cotton.

As Captain Schultze's cellulose after it streatment by acids is not explosive, it is manifest that the process does not convert it into the tri-nitro-cellulose of Baron Von Lenk, hence the necessity for the addition of nitric acid in combination with either potash or barytes.

A TRUE HERO.

"He that ruleth his own spirit is better than he that taketh a city." Gen. Grant, according to this statement, is a hero in the highest sense. Having fought nearly a whole year for the possession of Richmond, and having captured the city with its defending army, it would not have been unnatural had the General, following innumerable precedents, desired to enter in triumph as a conquering hero. Few men could have withstood the temptation. But Grant, whose modesty equals his military genius, stopping not for such momentary gratification, considering this no time to indulge in military displays, hastens to Washington to attend to the legitimate duties of his position. Declining all public ovations, he goes at once to the War Department, and, as the result of his advice, the following orders will be immediately issued:—

To stop all drafting and recruiting in the loyal States.

To curtail purchases of arms, ammunition, Quartermaster and Commissary supplies, and reduce the expenses of the military establishment in its several branches.

To reduce the number of general and staff officers to the actual necessities of the service.

To remove all military restriction upon trade and commerce, so far as may be consistent with public safety.

It is estimated that these orders will save to the Government one million dollars per day. Gen. Grant thus shows himself to be not only a military hero, but also a true friend to the people.

HORSE POWER.

When Watt began to introduce his steam engines he wished to be able to state their power as compared with that of horses, which were then generally employed for driving mills. He accordingly made a series of experiments, which led him to the conclusion that the average power of a horse was sufficient to raise about 33,000 lbs. one foot in vertical hight per minute, and this has been adopted in England and this country as the general measure of power.

A waterfall has one horse power for every 33,000 lbs. of water flowing in the stream per minute, for each foot of fall. To compute the power of a stream, therefore, multiply the area of its cross section in feet by the velocity in feet per minute, and we have the number of cubic feet flowing along the stream per minute. Multiply this by $62\frac{1}{2}$, the number of pounds in a cubic foot of water, and this by the vertical fall in feet, and we have the foot-pounds per minute of the fall; dividing by 33,000 gives us the horse power.

For example:—A stream flows through a flume 10 feet wide, and the depth of the water is 4 feet; the area of the cross section will be 40 feet. The velocity is 150 feet per minute—$40 \times 150 = 6000$=the cubic feet of water flowing per minute. $6000 \times 62\frac{1}{2} = 375{,}000$= the pounds of water flowing per minute. The fall is 10 feet; $10 \times 375{,}000$=the foot-pounds of the water fall. Divide 3,750,000 by 33,000, and we have $113\frac{2}{3}\frac{1}{3}$ as the horse power of the fall.

The power of a steam engine is calculated by multiplying together the area of the piston in inches, the mean pressure in pounds per square inch, the length of the stroke in feet, and the number of strokes per minute; and dividing by 33,000.

Water wheels yield from 50 to 91 per cent of the water. The actual power of a steam engine is less than the indicated power owing to a loss from friction; the amount of this loss varies with the arrange ment of the engine and the perfection of the work manship.

The Atlantic Telegraph.

Captain James Anderson, of the Cunard mail steamer *China*, has been appointed to command the *Great Eastern* during the laying of the Atlantic Telegraph cable. The *Great Eastern* will sail from Valencia, Ireland, about the 1st of July, and may be expected at Heart's Content, Trinity Bay, by the middle of that month. There were sixteen hundred and sixty-two nautical miles of cable completed on the 21st of March, and the whole twenty-three hundred miles will be made and on board of the *Great Eastern* in May.

The English Admiralty have agreed to order two powerful steamers of the Royal Navy to accompany the *Great Eastern* from Ireland to Newfoundland, and also to direct Vice Admiral Sir James Hope to afford such assistance on the approach of the expedition to Newfoundland as may be in his power.

It is confidently expected that Europe and America will be in telegraphic communication before the 20th of July.

GREAT GUNS.—The iron-clad *Stonewall* turned tail and ran away from two wooden ships with nothing but great guns and stout hearts to protect them.

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BOOKS AND PUBLICATIONS.

INTERNAL REVENUE LAWS—As Amended by the last Congress. With Copious Marginal References. A Complete Analytical Index and Tables of Taxation. Compiled by Horace Dresser.

This is a very valuable publication, and ought to be in the hands of all who wish to be informed of our internal revenue tax system. It is published by D. Appleton & Co., No. 443 Broadway, New York.

INCOME RECORD. A List giving the Taxable Income of Every Resident of New York.

This work has just been issued by the American News Company, No. 121 Nassau street. Price, 75 cents. We select a few of the names of those who paid tax on the largest incomes:—

A. T. Stewart, the well-known merchant on Broadway	$1,843.637	August Belmont	$100,930
W. B. Astor	838,525	L. C Clark	110,975
Cornelius Vanderbilt, the great speculator	680 728	D. Crawford	149,098
Legrand G. Lockwood	512,900	Peter Cooper	106,879
W. E. Dodge	392,217	David Dows	168,674
W. & J. O'Brien	189,051	W. W. De Forrest	157,509
Moses Taylor	573,494	Daniel Drew	101,293
Henry Young	159,464	C. P. Fischer	157,038
Rufus L. Lord	209 968	Peter Goelet	173 067
A. Stuart	112,762	P. Hayden	158,144
W. A. Brice	100,000	L. W. Jerome	100,000
James Brown	261,699	Bradish Johnson	135,545
Thomas Denny	106,352	John T. Lord	110,443
C. E. Detmold	103,893	B. H. Lewis	114,763
D. B. Fuller	106,539	Joseph Sampson	126,228
Arthur Gillender	350,000	Aaron Arnold	158,929
J. C. Greene	142,354	J. S. Schultz	100,228
John Taylor Johnston	161,050	I. H. Lord	110,443
J. B. Johnston	110,829	Samuel Mitchell	109,824
Samuel Lord	177,929	H. T. Morgan	134,708
Peter Lorillard	289,098	Peter Moller	111,800
John S. Lyle	120,334	Edwin D. Morgan	110,053
Paul Spofford	100 000	George Opdyke	112,800
J. Thorn	137,699	J. D. Phelps	113,200
George Bliss	148,980	Phœnix Phillip	229,864
G. F. Butman & L. A. Dowley	128,120	J. Tobin	149,400
		T. M. Taylor	105,200
		Wm. Paton	284,510
		John Watson	166,591
		W. H. Webb	133,230

We shall all agree that these men ought to enjoy a comfortable living, but it would doubtless appear on examination that they are less happy than the same number of industrious mechanics picked out at random in any of the trades of this city.

A SUCCESSFUL COMMANDER.

Gen. Grant is the only one of our great commanders who has actually compelled, through the combined agency of stubborn fighting and stragetical skill, the surrender of rebel armies. Thomas nearly annihilated Hood in Tennessee; Sheridan nearly did the same thing to Early's army in the Shenandoah Valley, while Sherman has always outgeneraled his antagonist in a manner that places his name among the great military chieftains of history. It has, however, been reserved to Gen. Grant not only to defeat but also to cause the actual surrender of three large rebel armies. At the battle of Fort Donelson, in 1861, he compelled the surrender of nearly the whole force, amounting to about 15,000 men. In 1863 he drove Pemberton into Vicksburg, and captured his whole army, 31,000 strong. And now, to give the finishing stroke to his masterly skill, he attacks the largest army of the rebellion in its entrenched position, defeats that army, and compels its absolute surrender. Grant thus earns a place in history second to no other military chieftain.

THE YANKEE NUT-CRACKERS.—The Richmond correspondent of the London *Times*, February 16th, predicts "that General Lee's army will be a hard nut to crack, which will severely try the jaws not only of General Grant, but General Sherman." This Englishman, if he is yet in Virginia, has discovered before this that Grant does not crack nuts with his jaws. He has one of those new fangled Yankee machines, which takes the nut in iron grip, and smashes it with ease. This patent affair is beyond the Rebel ingenuity to counterpart, and it will squeeze the whole life out of the Rebellion before it ceases its tenacious pressure.—*Philadelphia Inquirer.*

[It 's squeezed.—EDS.

BREAKING ROCK BY FIRE.—The ancient method of breaking rocks by fire, has lately been revived at the Rammelsberg Mine, in the Hartz Mountains. In a portable furnace about one and a half bushels of coke burn from 4 P. M., to 5 A. M., when the furnace is removed, and the rock left to cool, after being sprinkled with water. About noon the face of the rock spontaneously detaches itself: and after that, a further portion is broken. The effect of the fire extends to eight inches, and with one and a half bushels of coke, from 1600 to 2400 weight of ore is obtained at half the cost of the gunpowder process.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING APRIL 11, 1865.

Reported Officially or the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

47,177.—Manufacture of Ordnance.—Horatio Ames, Falls Village, Conn.:

I claim, First, Making the interior ring, a, of a combined series, out of solid metal, and without a weld, substantially as and for the purpose described.

I also claim making the section of a series of concentric rings, of which the inner one is longer than the one outside of it, substantially as and for the purpose described.

I also claim welding the sections to the mass during one and the same heat, by means of two hammers or rams, one working horizontally and the other vertically, substantially as described.

I also claim combining with the centralizing or matching pin, G, the arms and handles, g h, by which it is more readily operated, held and withdrawn, substantially as described.

47,178.—Lazy Jack for Vessel's Sails.—Daniel R. Arnold, Haddam, Conn.:

I claim a revolving lazy jack surrounding the boom, sail and gaff, substantially as set forth and described.

47,179.—Staging for Buildings.—Wm. Arronquier, Worcester, Mass.:

I claim the construction of the supporting bars and platform, and their combination with the ladders, forming a staging, as described.

47,180.—Boiler Feeder.—J. W. Bishop, New Haven, Conn.:

I claim the combination of the vessels, B and D, diaphragm, c, or its equivalent, with a steam boiler supplying pumps, when constructed and arranged to connect or disconnect the power operating said pump, as and for the purpose substantially as herein set forth.

47,181.—Automatic Boiler Feeder.—J. W. Bishop, New Haven, Conn.:

I claim the combination of the vessels, B and D, diaphragm, c, or its equivalent, with inlet and exit pipe, C and M, constructed and arranged to operate a valve, A, substantially as and for the purpose specified.

47,182.—Steam Trap.—J. W. Bishop, New Haven, Conn.:

I claim the combination of the vessels, B and D, diaphragm, c, with a water tank or reservoir and steam boiler, constructed and arranged to operate the valves connected therewith, substantially as and for the purpose herein set forth.

47,183.—Low-water Indicator.—J. W. Bishop, New Haven, Conn.:

I claim, First, The combination of the two vessels, B and D, arranged as described, with a diaphragm, c, or its equivalent, in the manner and for the purpose substantially as herein set forth.

Second, The combination of the vessels, B and D, diaphragm, c, or its equivalent, with a steam boiler, when arranged to operate substantially as and for the purpose specified.

47,184.—Water Regulator.—J. W. Bishop, New Haven, Conn.:

First, I claim the valve, C, when constructed with a hollow stem, and combined with chambers, F and G, substantially as and for the purpose herein set forth.

Second, Adjusting the pressure of water in pipes by means of the chamber, G, and cocks, L and O, substantially as herein specified.

47,185.—Skate.—Daniel S. Brigham, Worcester, Mass.:

First, In combination with the supporting plates, A B, the clamp bolts, E G, clamp lever, H, and lock plates, b, of the heel and sole, substantially as and for the purposes described.

Second, Providing one or both of the catch bolts E G, with a pin which enters the leather of the sole or heel, to prevent any longitudinal motion of the skate, substantially as herein described.

Third, The application to a yielding or elastic runner of the adjusting screw, L, for the purpose of making the bottom part of the runner flat or crowning, substantially in the manner described.

Fourth, The combination with the supporting plates, A B, of the clamp bolts, E G, clamp lever, H, elastic runner, D, and adjusting screw, L, when constructed and operated substantially as and for the purposes described.

47,186.—Fanning Mill.—J. K. Buck, Winona, Minn.:

I claim the combination of the elevator, B, shaft, e, provided with the pulley, d and wheel, b, with the driving wheel, a, when all the parts are arranged to operate as and for the purpose herein set forth.

47,187.—Saw-set.—John Ruser, Philadelphia, Pa.:

I cloim, First, The pinchers, A, with their jaws, b b', and cheeks e e, combined with the within-described devices, or their equivalent, substantially as and for the purpose specified.

Second, The plate, C, its projection, d, and arm. f, in combination with the pinchers, A, and springs, g g, or their equivalents, the whole being constructed for joint operation, substantially as described.

Third, The adjustable plate, i, combined with the plate, C, substantially as and for the purposes set forth.

47,188.—Composition for Removing Scale from Boilers.—Jacob Buzby, Philadelphia, Pa.:

I claim the use for removing scale from steam boilers of a decoction of the bark of the sweet gum tree, in combination with a solution of gambeer or catechu.

47,189.—Gas Regulator.—Charles M. Cresson, Philadelphia, Pa.:

I claim the use in a gas regulator of a holder of the tapering form herein described, for the purpose specified.

47,190.—Machine for Spinning Flax.—Caleb S. Davis, Lancaster, Pa.:

First, I claim the direct application of steam to the rovings, in their passage through a chamber, I.

I claim a chamber, I, having a series of slots, Y, and caps, U, with a steam pipe, M, having perforations, z, opposite the slots, Y, within said chamber, together with valve, L, in combination with the connecting pipe, m', arranged and operating in the manner specified.

I also claim a modified chamber, I', with its slots, Y, enlarged in combination with the disk or pulley, X, lever, W, and steam pipe, M, without perforations, constructed and operating in the manner and for the purpose specified.

47,191.—Machine for Holding the Uppers of Boots and Shoes.—E. M. Dickinson, Fitchburg, Mass.:

First, I claim the forked clamp, B, the springs, i i, the yoke, j, and the springs, K K, or their equivalents, in combination with the rest, A, as substantially described.

Second, I claim the forked clamp, B, the springs, i i, the yoke, j, and the springs, K K, or their equivalents, the rest, A, in combination with the rod, d, and the spiral spring, g, or their equivalent, for the purpose herein set forth, reference being had to the accompanying specifications and drawings.

47,192.—Press.—Hezekiah Dodge, Albany, N. Y.:

First, I claim the combination of the right and left hollow screw, E, fixed screw, G, and movable screw, F, with the follower, D, substantially as and for the purposes described.

Second, The stationary and movable right and left screw shafts, F and G, hollow screw, E, and spur wheel, C, with the driving spur wheel and shaft, B, B', substantially as described.

47,193.—Pump.—Wm. Foster Dodge, New York City:

First, I claim the cylinder cover, C, the air chamber, D, and the covers for the two side pipes, when such parts are united with the cylinder, A, and side pipes by a single plane joint, substantially as described.

Second, In combination with the air chamber, arranged directly over the cylinder, and with the stuffing box on the top of the so-arranged air chamber, I claim the tube, E, surrounding the piston rod, connecting the top of the air chamber with the cylinder cover, and isolating the piston rod and stuffing box from the air chamber, substantially as and for the purpose herein specified.

47,194.—Apparatus for Withdrawing Tubes from Wells.—Wm. H. Downing, Philadelphia, Pa.:

First, I claim the jaws or arms, A A, having projections, a' a', and adapted to be opened or spread by the spring, F, and lever, G, when lowered into the tubing of a well, for the purpose of taking hold of and raising the same, substantially as herein set forth.

Second, I claim the combination of the toggles, C C, yoke, C', and cord, D, for contracting the jaws, A A, when the apparatus is to be withdrawn from the tubing, as explained.

Third, I claim the detachable cap, E, employed to retain the jaws, A A, in their closed position while the apparatus is being lowered into the tubing, substantially as described.

[This device consists essentially of two pivoted jaws, having teeth or sharp projections on their outer faces, adapted to indent or penetrate the metal tubing to be withdrawn from oil wells. The jaws are thrown forcibly open to make the teeth catch the tube, by means of a spring and a lever, the latter being made to operate by means of a cord pulled by hand, which throws the end of said lever against the two jaws, opening them and forcing them toward the sides of the pipe with great force.]

47,195.—Upper Bearings or Bolsters for Spindles of Spinning Frames.—Mexworth D. Drake, Providence, R. I.:

First, I claim the use and employment of an upper and lower groove or oil chamber in the bore of the bolster, in combination with the use and employment of a spiral or helical groove, substantially as described.

Second, The use and employment of a spiral groove in the bore of the bolster, in combination with a groove, a, at the bottom, whether the top groove is used or not.

47,196.—Piano-fortes.—Spencer B. Driggs, New York City:

First, I claim the sounding chamber, B, provided under the case proper of the piano forte, substantially as and for the purpose herein specified.

Second, Connecting each or any one of the strings with the sound-board bridge independently of the other strings by means of two metal bearings, t m, constructed or provided on or in one side of a stud, n or p, secured in the bridge and having between them a lateral opening through which the string can be inserted in a lateral direction substantially as herein described.

47,197.—Wardrobe Bedstead.—John Eby, Muncie, Ind.:

I claim the combination and arrangement of the posts, A A C C and F F, bars, B B and G, rails, D and E E, doors H and K K, with the elevating board, P, and table, T, the whole being constructed as described for the purpose specified.

47,198.—Composition and Manufacture of Iron.—Alexander H. Everett, New York City:

First, I claim the combination of cast iron, wrought iron, oxide of manganese, oxide of iron and fluor-spar or other fluoride as and for the purposes set forth.

Second, The combination of cast iron, magnetic iron ore, oxide of manganese and fluor-spar or other fluoride substantially as set forth and described.

Third, The process herein described for improving the qualities of cast iron.

47,199.—Tobacco Pipe.—George W. Francis and Wm. L. Woods, Washington, D. C.:

We claim, first, The combination of case, A, with its air holes, F F, with the bowl, B, and its nipple, D, the cap, C, the grooves, G, and air chamber, x, substantially as described.

Second, The combination of the bowl, B, and cap, C, with its air holes, F, substantially as described.

Third, The bowl, B, with its nipple, D, and cap, C, when arranged and operating substantially as described.

47,200.—Pumps.—Kingston Goddard, Philadelphia, Pa.:

I claim the construction and arrangement of the tubular and perforated piston rod substantially as described.

47,201.—Machine for Rolling Tea Leaves.—Kingston Goddard, Philadelphia, Pa.:

I claim the machine substantially as described which submits the leaves to the rolling action of the two described rollers.

47,202.—Method of Preserving Eggs.—Wm. Hansford, San Francisco, Cal.:

I claim the coating of eggs with glue substantially as and for the purposes herein recited.

47,203.—Fence.—Davis Harvey, Jackson Township, Iowa:

I claim placing upon any common fence a panel, or board projecting outward and upward for the purpose of preventing dogs and wolves from getting to sheep.

47,204.—Tonic Bitters.—Isaac Hellman, St. Louis, Mo.:

I claim the combination of the several ingredients mentioned in the foregoing specification in the proportions and for the purpose set forth.

47,205.—Apparatus for Generating Carbonic Acid Gas.—Peter and Frederick Hinkel, New York City:

We claim, first, the long necked jar, l, hose, r, or their equivalents and the air tight connection between them and the cover of a gas generator, A, as described or its equivalent.

Second, We further claim the sliding bar, m, the wires, w w, or their equivalents and the connection of them with jar, l, hose, r, and cover, k, in the manner fully described or its equivalent, and for the purpose set forth.

47,206.—Wash Board.—Nelson Homes, Laona, N. Y.:

I claim the wash board composed of the plane edged slats or bars, B B, fitting closely together so as to prevent the leakage of water through, and having a necessary degree of elasticity, said slats being provided with corrugations, a a b b, so arranged that the corrugations of any one slat alternate with the next substantially as and for the purpose described.

47,207.—Instrument for Lighting Gas.—Thomas W. Houchin, Morrisania, N. Y.:

In combination with the tube, A, I claim the use or employment of the wick or taper, B, cord or string, C, and attachment, D, when the frame shall be constructed and combined substantially as shown for the purpose specified.

47,208.—Straightening Rails of Railroads.—John Johnston, Alexandria, Va.:

I claim the use for straightening rails of three or more pairs of rollers having depressions and projections conforming to the shape of the rails, the rollers themselves as well as the said depressions and projections of the several pairs being arranged in respect to each other as set forth.

47,209.—Machine for Pressing Brick.—John K. Lemon, Allegheny City, Pa.:

I claim a brick press which employs a pressing follower, C, and a movable supporting follower, b, which are so combined and operated that the latter is allowed to descend by its own gravity during the introduction of a brick into the press box, and to rise during the retrocession of the pressing follower, C, substantially as herein described.

Second, A spring, d, or its equivalent for elevating the follower, b, in combination with the crosshead, E, and rods, f f, of the frame, C', for allowing the follower, b, to descend, substantially as described.

Third, Providing for adjusting the followers, C and b, so as to

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work nearer to or farther from each other according to the thicknesses of the bricks required substantially as described.

Fourth, Sustaining the follower, b, when in an elevated position upon a spring, d, or its equivalent, and when it is in a depressed position upon the bottom, l i, of the press box, a, substantially as described.

Fifth, The combination of a reciprocating follower, G, and guides, H H', with the movable followers, C and b, substantially as described.

Sixth, A movable separating board, K, in combination with a brick press in which the three followers, C b and G, are employed substantially as described.

Seventh, The separator, K, when used in conjunction with a follower, G, or its equivalent, and a removable shelf, M, substantially as described.

Eighth, The parallel guides, H H', in combination with the movable followers, C b and G, arranged and operating substantially as described.

47,210.—Clamps for Stretching Card Clothing upon Carding Cylinders.—Joshua O. Lewis, Worcester, Mass.:

I claim as a new article of manufacture a card-clothing clamp constructed with forked braces to sustain and strengthen the ends of the clamp jaws so that they cannot spring or yield, and with looped ends for the operating strap all substantially as and for the purposes described.

47,211.—Carriages.—Lewis W. Mason, Shelburne Falls, Mass.:

I claim my pecullar arrangement of two sets of shafts, A B C D, and crossbar, E, with the whiffletrees, F G, whereby the crossbar carrying the whiffletrees is brought in rear of the draft animals when they are between the shafts.

I also claim the combination and arrangement of the connector, K, and the two sets of shafts, A B C D, and the crossbar, E.

I also claim the combination and arrangement of the two mud guards, L L, with the two sets of shafts and their crossbar, E.

47,212.—Lantern.—John G. Leffingwell, Newark, N. J.:

I claim the lugs, C, when used in the manner and for the purposes specified substantially as described.

Second, My device for attaching the lamp to the lantern part by means of the hooks or flanges represented working in combination with a spring substantially as set forth.

Third, The lantern as it stands with its several devices, to wit, lugs, hooks or flanges and spring fastening with rivets, reflectors and posts combined and arranged substantially as described.

47,213.—Packing Projectiles for Rifled Ordnance.—Albert J. S. Molinard, Baltimore, Md.:

I claim the inclination of the mortises or openings, E, connecting the conical hole in the base with the outer belt of metal or packing, in combination with the soft metal packing united to the shot as therein described and the tapering of said packing to a thin feathered edge at or near the base of the short that is raised by the gases acting simultaneously against the solid lead at the base and feather edge at the time of the discharge for the purpose set forth.

47,214.—Helve.—Wm. Morehouse, Buffalo, N. Y.:

First, I claim a helve or handle, A, constructed with sockets, c, therein substantially as and for the purposes described

Second, I claim a helve or handle, A, constructed with a concavity, b, therein substantially as and for the purpose described.

Third, I claim so forming ax-helves and other handles that when fastened in the eyes of implements by wedges of wood the wedges will be allowed to expand and swell into recesses or sockets formed in the handles substantially as and for the purpose described.

47,215.—Alarm for Railroads.—C. P. Morton, Chester, Pa.:

I claim the combination of the arm, F, spring, H, projections, f' f2, with the rod, M, and bell crank, L, so constructed and arranged as to operate in connection with the draw-bridge, C D, in the manner and for the purpose herein described.

47,216.—Fruit Can.—Joseph Newberger and Peter J. Illig, Buffalo, N. Y.:

First, As a distinct article of manufacture a rim, A, made of tin or other similar material having a slightly tapering neck with a groove, a', formed therein for receiving and holding a packing strip, C, substantially as and for the purpose set forth.

Second, In making a cap or cover, B, to fit on to the taper neck of the rim and having a flange, b, formed thereon in combination with a button, D, for the purposes and substantially as described.

47,217.—Treating Straw to Obtain Paper Pulp.—Theodore A. Nixon, Philadelphia, Pa.:

First, I claim manufacturing paper pulp from straw by a process substantially as described.

Second, subjecting the prepared straw to the action of a hot solution of alkali prior to boiling the same substantially as set forth for the purposes specified.

47,218.—Stove.—Edwin A. Parker, Horseheads, N. Y.:

I claim the special arrangement for supplying the air draw from the outside of the room, partly to support the combustion and partly to supply the room, the same consisting of the passage, E, central heating chamber, G, the induction pipe, H, and the draught pipe, I, operating substantially in the manner and for the purpose herein set forth.

47,219.—Churns.—Edward J. Phillips, Prescott, Wis.:

I claim the crank wheel, A, pitman, B, and adjustable wrist, I, in combination with the dasher, C, and guide pin, D, the several parts being constructed, arranged and operating as and for the purpose herein set forth.

47,220.—Velocipede.—Wm. Quinn, Philadelphia, Pa.:

First, I claim the combination of the two cranked axles, G and G', with the connecting link, z, with the bearing, c, substantially for the purpose as described and shown.

Second, The construction of the fulcrum bearing, N, the treadle levers, when used in combination with the brace, D, substantially as described and shown.

Third, The construction and arrangement of the frame, as hereinbefore set forth and described.

47,221.—Dying Kid Gloves.—Josiah T. Reed, Charlestown, Mass.:

I claim as a new article of manufacture a kid glove having the inside of the same color as the skin from which it was made, and the outside being colored of any desired shade after the glove is cut out and sewed, substantially as described.

I also claim the art, method or process of coloring kid gloves by applying with a brush or sponge the required dye or color to the exterior of the glove while it is stretched upon a suitable form or mold.

47,222.—Apparatus to Preserve and Exhibit Photographs.—Charles Robinson, Springfield, Mass.:

I claim the combination of a continuous band, G, provided with means for mounting the photographs thereon, two cylinders, B C, of sufficient diameter not to injuriously affect the appearance of the photographs by being bent around them, and an inclosing box or case, A, provided with an aperture or apertures, H H, through which the photographs are exhibited, substantially as and for the purposes herein specified.

I also claim the brake clamp shown in Fig. 4, for keeping the tangent portion of the connecting band or strip straight, as herein set forth.

47,223.—Clothes Pin.—Henry W. Sergeant, Jr., Boston, Mass.

I claim constructing a clothes pin with three flexible prongs, substantially as and for the purpose described.

47,224.—Pump for Oil Well.—John B. Root, New York:

I claim, First, The employment in an oil well of tubing composed of wooden staves and surrounding bands of metal, substantially as herein specified.

Second, The arrangement of the pump cylinder, in combination with the tubing of wood, substantially as herein specified, whereby the said cylinder can be drawn up through the tubing without disturbing it.

Third, The arrangement of the pump cylinder in the interior of the tubing of wood in an oil well, whereby the said cylinder and its piston may be withdrawn together from the said tubing by means of the piston rod, substantially as herein described.

47,225.—Machine for Boring Wells.—Charles A. Saxe, Philadelphia, Pa.:

I claim, First, The combination of the drill frame and the frame that carries the double cam planes, both suspended to the screw nut, and arranged to operate substantially as herein described and represented.

I also claim, in combination with a drill or boring tool that is raised and dropped, rotated, and fed up to the work, as herein described, the gear, U, and its stem or shaft, by which said feed motion may be increased, diminished, or suspended, as and for the purpose set forth.

I also claim, in combination with the raising and dropping, rotating, and feeding mechanism, the gear, V, and its appliances for raising the drilling tool and its frame, and automatically stopping its action when the drill is up, and without stopping the first moving power, substantially as described.

47,226.—Oil Ejectors.—S. Franklin Shoonmaker, New York City:

I claim, First, The use, in apparatus employed for the raising of liquids from great depths or to great hights, of an annular-shaped orifice or opening for producing an air blast in the same, said orifice being so arranged as to allow the liquid to be raised, to come in contact with both the exterior and interior surfaces of the air blast, substantially as described and for the purpose specified.

Second, In combination with the nozzle, c c, having an interior oil passage, the conical plug, n, or its equivalent, arranged and operating substantially as and for the purpose specified.

Third, Adjusting the hight of the nozzle of the air pipe in the oil or liquid pipe, the same consisting in the use of the movable plate or ring, e e, arranged and operating substantially as described.

47,227.—Oil Ejectors.—S. Franklin Shoonmaker, New York City:

I claim, First, Forming the delivery nozzle of an air blast pipe in elevators for petroleum or other liquids, of a series of pipes of any desired number and size, with their delivery ends in the same horizontal plane, and having the form of a circle or any other suitable form, and so arranged as to give the oil in the oil tube and surrounding the air pipe a passage through which to communicate with and to approach the interior surface or surfaces of the air blast, substantially in the manner and for the purpose specified.

Second, The combination with the double truncated conical diaphragm, o p, of the adjustable cone, l, arranged together substantially in the manner and for the purposes satisfied.

47,228.—Egg Boiler.—Abel Sharlow, Fort Lee, N. J.:

I claim as a new article of manufacture the culinary vessel, A, when constructed and operated substantially as described for the purpose set forth.

47,229.—Ditching Machine.—J. H. Snyder, Killbuck, Ill.:

First, I claim the guides, m' n', spring catches, r, and levers, m n, in combination with the adjustable standards, p, and slides, L, as and for the purpose set forth.

Second, I claim the curved levers, G', arms, j, in combination with the scrapers, G, and links, H, as and for the purpose set forth.

Third, I claim the standards, E, cross trees, h', in combination with the shoes, D, and scrapers, G, as and for the purpose set forth.

Fourth, I claim the carriers, f, guides, f', and spring, g', in combination with the shoots and scrapers, as and for the purpose set forth.

47,230.—Signal Frames.—William A. Sprague, Boston, Mass.:

I claim two kinds of frames to extend signals when there is no wind, as herein described and set forth in this specification.

47,231.—Fuse Hood for Explosive Shells.—Thos. Taylor, Washington, D. C.:

I claim the use of the flame hood, E, located between the front end of the shell and the front of the fuse, held secure in its place by the flange of the plug, c, the same constructed and operated substantially as described.

47,232.—Sediment Extractor for Steam Boiler.—Eli Thayer, Worcester, Mass.:

I claim the vessel, O, when arranged in the manner and for the purposes substantially as set forth.

47,233.—Flour Bolt.—Francis S. Thayer, Troy, N. Y.:

I claim the use of one or more falling weights, in combination with an inclosed tube, when the said tube passes entirely through the shaft, thus allowing the weights to fall from side to side of the bolt, substantially as and for the purpose set forth.

47,234.—Box for Transporting Plants.—Timothy F. Wardwell, Penn Yan, N. Y.:

I claim a box for plants, etc., formed by the flat pieces of wood grooved and set together in the manner specified, and provided with an opening, for the purposes and as set forth.

47,235.—Apparatus for Distilling Petroleum, Etc.—Cyrus M. Warren, Boston, Mass.:

I claim the special application of heat by means of a separate fire, or its equivalent, to a condenser attached to a still, for the purpose of controlling and regulating the temperature of the vapors given off in distillation, in order to produce a more complete separation of the constituents of complex mixtures of liquids.

47,236.—Machine for Pressing and Shaping Screws.—Thomas Welham, Washington. D. C.:

I claim the combination and arrangement of the movable and adjustable dies, H, and revolving stop, J, as herein described, for the purpose of pressing and shaping screws by pressure, instead of cutting and swaging the threads of screws as heretofore.

47,237.—Machine for Leveling and Smoothing Ice.—Wm. Wharton, Jr., Philadelphia, Pa.;

I claim, First, A machine for leveling and smoothing ice, consisting of a frame to which one or more blades or plates are secured, so that they may be carried across the ice perpendicular, or nearly perpendicular, to the surface of the latter, substantially as described.

Second, The inclined draught pole, C, combined with the frame, A, and its blade, a, substantially as and for the purpose described.

Third, The frame, A, its blade, a, draught pole, C, and guide rod, B, with its support, D, the whole being constructed and arranged substantially as and for the purpose specified.

Fourth, The detachable plank, H, in combination with the frame, A, and draught pole, C, arranged substantially as and for the purpose specified.

47,238.—Stopper for Fruit Jars.—John M. Whitall, Philadelphia, Pa.:

I claim a hollow stopper, with an opening at the top, and a cavity in it to hold ice or cold water, substantially as described, for the purpose specified.

47,239.—Knitting Machine.—Joseph Whittle, Philadelphia, Pa.:

I claim, First, The self-acting needles, a', with their long latches operating in combination with the self-acting needles, a, and their short latches, substantially as and for the purpose specified.

Second, The cam cylinder, forming a zig-zag groove, one or more of the projections in which are cut away, in the manner and for the purpose described.

47,240.—Automatic Valve for Steam Radiator.—James P. Wood, Philadelphia, Pa.:

I claim the cup, B, diaphragm, C, and valve, D, in combination with the vessel, A, and its tubes, E and F, or their equivalents, the whole being arranged and operating substantially as and for the purpose herein set forth.

47,241.—Chain Hook.—Michael Colgan (assignor to himself, Charles D. Cooper and L. H. Beckwith), Port Jarvis, N. Y.:

I claim the hook, A, in combination with corresponding suitable size chain links, B and D, so constructed that the hook will grasp the chain in the manner herein described, for the purposes set forth.

47,242.—Horse-shoe.—Oliver P. Macgill, Brooklandville, Md., assignor to himself and Thomas Poultney, Baltimore, Md.:

I claim, First, The expanding frame, to be attached to the horse-shoe, and provided with calk points or edges, substantially as described.

Second, I claim the removable roughing points or calks passing through the frame and resting at their upper ends (in situ) upon the under side of the horse's shoe.

Third, I claim the method of securing the false shoes to the ordinary shoe by means of the flanges on the expanding bars of the false shoe.

Fourth, The expanding false shoe, consisting of two parts hinged together, and provided with the expanding screw, substantially as described.

47,243.—Air Pump.—James Molyneux (assignor to the Bordentown Machine Company), Bordentown, N.J.:

I claim the combination of two air pumps, having barrels of different diameters, with an air vessel or reservoir, G, situated between and communicating with both pumps, all substantially as set forth.

47,244.—Harness Saddle.—Oliver B. North (assignor to O. B. North & Co.), New Haven, Conn.:

I claim the use of studs or pins upon the frame, for the purpose of holding or of aiding to hold the skirts, jockeys, back or tug straps of the harness thereto, substantially as described.

I also claim casting the bolt or projection, e, on the under side of the seat, as and for the purpose herein described.

47,245.—Carriage Bolt.—Alvin Pond, Hamden, Conn.:

I claim manufacturing bolts from round iron by means of dies formed so as to produce sharp corners at the ends of the squared portion, as set forth.

47,246.—Machine for Cupping Metallic Cartridges.—Timothy J. Powers (assignor to J. P. Fitch and J. R. Van Vechton), New York City:

I claim, First, The combination, as described, in a machine for cutting out and cupping cartridge shells of the punch, d, dies, i c e, and adjustable table, B, the whole operating as and for the purpose herein set forth.

Second, The rising and falling gage, p, applied in combination with the punch and dies, operated by means of a rod, q', tappet arm, q, and tappet collars or pieces, p' p2, and controlled by a rest, r, substantially as and for the purpose herein specified.

47,247.—Automatic Grain Weigher.—Martin Robbins (assignor to himself and Mahlon M. Wornbaugh), Cincinnati, Ohio:

I claim, First, The revolving and gravitating drum, E E', supported and balanced in the represented inclined position, and containing two or more chambers or compartments, F F' F'' F''', for the automatic weighing of grain, substantially as set forth.

Second, The provision, on an inclined gravitating grain drum, of the cams, J J' J'' J''', when combined with the devices, b b', C c, or their equivalents, for the automatic opening and closing of the hopper bottom, as set forth.

Third, In the described combination, with an inclined gravitating grain drum, armed with studs, K K' K'' K''', or other suitable projections, I claim the adjustable gage, D d, substantially as represented, or any mechanical equivalent thereof.

Fourth, The devices, L l l' l and M, or their mechanical equivalents, for the automatic opening and closing of each successive grain chamber, as set forth.

Fifth, The self-acting governor, consisting of the parts, P Q R S T U V W w, in the described combination, with the parts, b b C c, or devices, substantially equivalent, for the automatic arrest of the weighing action, as set forth.

47,248.—Syringe.—Luke Wheelock (assignor to himself and O. B. Leavenworth), New Haven, Conn.:

I claim a syringe when the discharged apertures are formed, substantially as and for the purposes specified.

47,249.—Well-boring Device.—Albert A. Wilson, Green Point, N. Y., assignor to himself and Hoffman Atkinson, Rouseville, Pa.:

I claim the method substantially as herein described of increasing the sectional area and strength of the concussion surface of jars, used in connection with tools for artesian well boring, for the purpose set forth.

47,250.—Shears.—George Carter, Nottingham, Eng.:

I claim constructing shears, scissors and other cutting instruments of a similar character thereto, with three edges, viz.: one cutting edge and two edges for keeping the cutting edge in proper position, and for preventing the same moving sideways, substantially as set forth and described.

47,251.—Filter.—M. Antome Espirat and Etienne Sause, Marseilles, France. Patented in France, Jan. 30, 1864. Patented in England, July 19, 1864:

We claim the combination of the filters, G H and R S, with their reservoirs, B and L, when constructed and operated substantially as and for the purposes described.

We also claim in combination with the filters and their reservoirs above described the self cleansing apparatus, consisting of pipe, p, reservoirs, c c' O', wheel, a, and syphons, d u, when constructed and operated as herein described.

We also claim in combination with the filters and the reservoirs, c c O', and their operating devices the recipient, x, and pipes, V Z, as substitutes for the pipe, p, as and for the purposes set forth.

47,252.—Revolving Fire-arms.—Alexander Guerriero, Genoa, Italy:

I claim, first, The combination in a revolver of the following parts, the barrel, the cylinder, the breech plate and the stock, when the said parts are constructed as described each being capable of being detached in the manner and for the purpose set forth.

Second, In combination with the many chambered cylinder and rotating breech plate I claim the means herein described of locking and unlocking the same.

Third, The combination of the rotating cylinder and breech plate, with a fixed breech casing and its spring packing device to hold the breech plate in place without interfering with its rotary movement.

47,253.—Barrel Packer.—Thomas Burns, Williamsburg, N. Y.:

First, I claim giving to the barrel the rocking motion, substantially as shown for the purpose specified.

Second, In combination with the flanged platform, A, levers, C C2, provided with the elongated slots, G G2, I claim the adjustable clamp, J, when the same shall be combined and operated, substantially as and for the purpose specified.

47,254,—Wick Scraper.—Charles W. Cahoon, Portland, Me.:

I claim a wick scraper, substantially as described.

47,255.—Saw.—Edwin S. Drake, Portland, Me.:

I claim as a new article of manufacture a saw constructed with cutting points or edges, substantially as described.

47,256.—Apparatus for Carbureting Air.—John H. Irwin, Chicago, Ill.:

I claim arranging a carbureting apparatus, provided with an inlet for air and an outlet for gas above the point of combustion, substantially as and for the purposes herein set forth and shown.

47,257.—Process for Carbureting Air.—John H. Irwin, Chicago, Ill.:

I claim producing a current of air through a carbureting apparatus and a pressure at the burners, by the action of heated air, substantially as and for the purposes herein specified and shown.

47,258.—Apparatus for Carbureting Air.—John H. Irwin and Isaac Simmons, Chicago, Ill.:

First, We claim so arranging a series of carbureting pans, A, with the chambers, C D, and connecting pipes, provided with stop cocks or other equivalents, that the apparatus may be regulated, controlled and operated, substantially as and for the purposes set forth and shown.

Second, We claim the combination of a series of carbureting pans with the chambers, C and D, and the two series of connecting pipes, G and L, provided with the stop cocks or their equivalent, operating substantially as and for the purposes specified and shown.

Third, We claim the combination of a series of carbureting pans with the chambers, C and D, and the three series of connecting pipes, G L and Q, substantially as and for the purposes specified.

Fourth, We claim, in combination with the series of pans, A, and the chambers, C D, the employment of a condensing chamber, E, as and for the purposes set forth.

Fifth, We claim connecting the said pans and chambers, A C D, by removable or detachable pipes, substantially as and for the purposes specified.

47,259.—Churn Dasher.—Danforth Johnson, Chicago, Ill.:

I claim a wooden churn dasher, conical or oval on the top, with wedging apertures around the bottom edge of the dasher for compressing the cream in the manner and for the purpose set forth.

47,260.—Scraper for Cleaning Gun Barrels.—E. L. Pratt, Boston, Mass.:

I claim the spring blades, when cut from sheet metal, and swayed or stamped into form, substantially as set forth.

I also claim the attachment of the blades to a shank or foundation piece, in the manner substantially as described.

I also claim the construction of the gun cleaner, by which the ring is prevented from slipping therefrom, substantially as set forth.

I also claim the employment of the swab, in combination with the spring blades, substantially as set forth.

I also claim the construction of the spring blades, by which they form a trumpet mouth, substantially as described

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47,261.—Filters.—Thomas Simmons, Chicago, Ill.:

I claim, First, The combination and arrangement of the spiral wire, C, the horizontal plates, H, and the fibrous covering, F, when inclosed inside of a case, A, substantially as and for the purpose set forth.

Second, The combination and arrangement of the above with the carbon cups, substantially as and for the purposes described.

47,262.—Flexible Types and Apparatus for Printing.—Henry Tubesing, Pittsburgh, Pa:

I claim making the separate pieces of elastic type, with a projection at top and bottom having a gutter for the purpose of holding them in place by means of a cord or similar device for that purpose.

Also the use of a flexible bed plate for holding the movable elastic tppe, so that the bed plate and type may be attached to the curved surface of a frame, substantially as described.

Also the use of strips of leather or other flexible material, placed above and below the upper and the lower line of type, for the purpose of keeping the movable type straight, and yet a lowing the form to be readily curved when set on the machine for the purpose of printing.

Also the mode of securing the movable elastic type to the bed plate, by means of elastic cords resting upon the projecting base of the type, substantially as described.

Also the combination of the flexible bed plate, A, flexible strips, b and d, and slide, e, with a curved or cylindrical frame for printing with movable elastic type, substantially as described.

47,263.—Ox Yoke.—Erastus S. Woodford, Winchester, Conn.:

I claim the manner of arranging the staples and cords, in combination with the blow blocks, 5 and 6, the center blocks, 1 and 2, and the caps, 3 and 4, as and for the purposes herein set forth.

REISSUES.

1,930.—Sewing Machine.—R. G. Fairbanks, New York. Assignee by Mesne Assignment of W. A. Akins and J. D. Felthousen. Patented August 5, 1851. Reissued January 20, 1863:

I claim, First, The combination of the needle bar of a sewing machine with a spring to draw up the needle after the stitch is formed, for the purpose of tightening the stitches, substantially as set forth.

Second, The combination of the stitch-forming mechanism and spool spindle with an intermittent thread-griping mechanism, located between the spool spindle and the place where the stitch is formed, substantially as set forth.

Third, The combination of the needle bar and shuttle driver of a sewing machine with mechanism for operating them in such manner that the shuttle is caused to enter between the needle and its thread, while the needle is arrested after having made a short retrograde movement.

Fourth, The combination in a sewing machine of the stitch-forming mechanism with a cylindrical rest, for the purpose of supporting articles of curbed or tubular form, substantially as set forth.

Fifth, The combination of a toothed feeding instrument with reversible driving mechanism, substantially as set forth.

1,931.—Gas Cock.—John G. Leffingwell, Newark, N. J. Patented Feb. 19, 1861:

I claim, First, A set screw, in combination with a lever and gas cock, to prevent the flame from being extinguished, substantially as described.

Second, A set screw, in combination with a lever and gas cock, to prevent too great a flow of gas to the burner, substantially as set forth.

1,932.—Tackle Block.—Isaac E. Palmer, Middletown, Conn. Patented Nov. 1, 1859. Reissued Sept. 8, 1863:

I claim so constructing a tackle block and pulley that the rope or fall, when desired, may be clamped between a fixed portion of the block and a portion of the pulley, substantially as herein described, by simply leading it in a direction oblique (lateral) to the plane of revolution of the pulley without tying, or the use of dogs, or movable stops, or any other means of fastening.

1,933.—Design for a Trade Mark for Lead Pencils.—Joseph Reckendorfer (assignee of Joseph Rosenthal), New York. Patented April 3, 1860.

I claim the design for a new trade mark label for lead pencils composed of an eagle in flight, with the words "Eagle Pencils," substantially as and for the purpose described.

DESIGNS.

2,042.—Sewing Machine.—Caleb Cadwell, Waukegan, Ill.

2,043.—Trade Mark.—Stuart Gwynn, New York.

2,044.—Clock Front.—G. S. Lovell, Philadelphia, Pa.

2,045.—Clock Front.—G. S. Lovell, Philadelphia, Pa.

2,046.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.

2,047.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.

2,048.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.

2,049.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell Mass.

2,050.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.

2,051.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.

2,052.—Composition in Alto-Relievo.—Helen P. W. Purdy, Cambridge, Mass.

2,053.—Trade Mark.—John C. Richard, New York.

PATENTS

GRANTED

FOR SEVENTEEN YEARS.

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MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

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WM. D BISHOP.

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Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

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The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
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SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c, may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model, is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

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Notes and Queries

M. E. E., of Mo.—We do not understand what you mean by converting centrifugal into centripetal force. In reply to your question whether a jointless arrangement for accomplishing it would be patentable, provided it was useful and new, we reply that any mechanical device which is novel and useful is patentable.

N. A. M. H., of Pa.—We have no idea that a constant electric current would prevent the deposit of paraffine. It could be easily tried.

C. H., of Pa.—If your engine yields six horse power with 100 revolutions per minute, and you increase the number of revolutions, maintaining the same pressure, you will increase the power in proportion; 150 revolutions will give you nine horse power.

C. N. B., of R. I.—You will find the best shingle machines illustrated in back numbers of the SCIENTIFIC AMERICAN, with address of parties there given.

W. H. H., of Phila.—Mr. H. C. Baird, No. 406 Walnut street, your city, can tell you all about works for scroll patterns.

F. L. K., of Wis.—You can obtain kalsomine, in the form of powder, from any dealer in paints and oils. You had better address D. F. Tieman & Co., N. Y., in relation to it.

J. S., of Ill.—Water in escaping from an opening in the vertical side of a vessel issues with a velocity just equal to that which would be acquired by a body falling from the surface of the water to a level with the opening. A body falling 9 feet acquires a velocity of about 23 feet per second. Water flowing at this velocity through a slit 50 by 2¼ inches. would issue at the rate of 17 cubic feet per second, equal to 1,062 pounds. This falling 9 feet would give 9,558 foot-pounds per second, equal to 573,480 foot-pounds per minute. Divide by 33,000 and we have 17-horse power. From the contraction of the vein and the great waste of a flutter wheel it is not probable that you would realize even half of this, probably not more than 5 or 6-horse power.

D. W., of Wis.—During the descent of the stone to the center of the earth there would be a mass attracting it downward greater than the mass attracting it upward; its velocity would consequently be constantly accelerated till it reached the center, and the momentum thus acquired would carry it through to the opposite side.

T. J. E., of Ill.—Air at the surface of the earth is subjected to a pressure of about 15 pounds to the square inch; if a portion be confined and compressed into half the volume the pressure will be doubled. The pressure is in inverse proportion to the volume.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

SPECIAL NOTICE TO INVENTORS.

The money receipts on account of patent business, which have heretofore been published in this column, and the notification of cases sent to the Patent Office, will for the present be discontinued. The receipt of specifications and money from inventors will be acknowledged promptly by mail.

Back Numbers and Volumes of the "Scientific American."

VOLUME IV., VII. AND VOLUME XI., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplie

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, pay able in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

WOOD-WORKING MACHINES.—ONE 24-IN. IRON Frame, Double Surfacer; one 6-inch Molding M., Improved Style; one Turning M.; one Scroll Saw; one Power Mortiser; one Boring M.; three Saw Benches; one Blind Boring M.; one Ellis Blind Slat M.; one Hub-mortising M., Etc. Address
17 3eow CHAS. H. SMITH, No. 135 North Third street Phila.

CHEST OF TOOLS.—WE HAVE FOR SALE ONE of Parr's Tool Chests—a very useful and complete article for a Mechanic, Farmer or Amateur. Price $50. Address MUNN & CO., New York. 17 tf

X. 1865. M.—THE RECIPE TO MAKE THE "EVER-READY GLUE" sent on receipt of $1. A certificate with each recipe, worth from $2 to $10, and something else. Address A. M. DUNLAP, Box No. 50, Candor, Pa. 1*

FLAX SEED.—200 BUSHELS OF CLEAN SAPLING Flax-seed for sowing, for sale, at $4 50 per bushel, by HOMER FLAX MILLS, Homer, Cortland Co., N. Y.
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PARTIES IN AMERICA HAVING VALID LETTERS Patent for Great Britain, and wishing to dispose of the same, or negotiate for royalty, may address CHARLES POMEROY BUTTON, Nos. 142 and 143 Cheapside, London, England.
N. B. The object of this advertisement is to obtain control of a few meritorious inventions already patented in Great Britain, and no application from inventors will be entertained except their invention shall have been provisionally protected prior to the publication of the invention in America.
For references apply to any Mercantile Association or Trade Protective Society in Great Britain. 12 13*

FOR SALE—ONE UPRIGHT ENGINE, SIX-HORSE power. Will be sold at a reasonable figure if called for soon. Apply at office of JOHN TRAGESER, No. 58 Greene st., N. Y. 1*

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The buildings are large, and well calculated for the present business, or for the manufacture of other goods, it having been used formerly as a paper factory, and is well calculated for that purpose.
The main building is 28x87 feet, with a wing attached 24x60. The store house is 16x81 feet. There is also a small foundery.
There will be sold with the above, if desired, a dwelling house and barn, and several building lots.
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Prof. H. DUSSAUCE, Chemist, is ready to furnish Plans of Oil Refineries and Drawings of Apparatus; Processes to Manufacture, Refine, Deodorize and Discolorize Petroleum, Recipes to Manufacture Lubricating Oils, Paraffine, Artificial Spirit of Turpentine, and Oil of Bitter Almonds, Colors of Coal Tar. Examination of Oil Lands and Analysis of Crude Oils, Reports on the same. Address New Lebanon, N. Y. 1*

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SEALED PROPOSALS WILL BE RECEIVED AT this office till WEDNESDAY, April 19, 1865, at 12 o'clock M., for Baling Blankets, from the 1st day of May next to the 1st day of November next, the contractor to furnish all material necessary to bale the blankets in a satisfactory manner to this department.
The services to be performed in the buildings of this depot, the contractor to furnish the machinery.
Bidders will state the number of bales they can put up per week
Bids will be received at the same time, for Coopering Packing Boxes at this depot, from May to November next, the contractor to furnish hoops, nails, etc., and be prepared to cooper any and all boxes at the shortest notice.
Bidders will state the number of boxes that can be coopered per day, and at what price per box.
Proposals must be accompanied by a proper guaranty, signed by at least two responsible parties, setting forth that if a contract is awarded to the party making the bid that he or they will enter into bonds for the faithful performance of the work.
Further information can be had at this office.
The right is reserved to the United States to reject all bids deemed objectionable.
Proposals should be indorsed "Proposals for Baling Blankets," or "Proposals for Coopering," and addressed to
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5,000 pairs Sewed Boots, No. 10, Army standard.
3,000 pairs Sewed Boots, No. 11, Army standard.
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8,000 pairs Sewed Bootees, No. 11, Army standard.
10,000 pairs Sewed Bootees, No. 12, Army standard.
5,000 pairs Sewed Bootees, No. 13, Army standard.
3,000 pairs Sewed Bootees, No. 14, Army standard.
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Parties offering goods should make separate proposals for each article offered, the quantity they propose to furnish, the price (*which should be written both in words and figures*), and conform to the terms of this advertisement, *a copy of which should accompany each proposal.*
Samples of the standard articles required may be seen at this office.
Samples, when submitted, must be marked and numbered to correspond with the proposals; and the parties thereto must guarantee that the goods shall be, in every respect, equal to army standard, otherwise the proposals will not be considered
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Each bid must be guaranteed by two responsible persons, whose signatures must be appended to the guaranty, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.
All proposals should be made out on the regular forms, which will be furnished on application at this office.
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Improved Car Spring.

However good the old-fashioned elliptic and semi-elliptic springs may be, still their great expense, and the large amount of space they occupy, have been inducements to inventors to rack their brains to bring out some other description of spring that would combine elasticity with cheapness and compactness. The principle of those at present in use are, first, the solid india-rubber cylinder, which makes a good spring for passenger cars, but is soon destroyed under freight cars. Then comes spiral springs which are used in various ways. The Camden and Amboy railroad use six or eight of them, made of about three-eighths round steel, and two and a half inches

Fig. 1

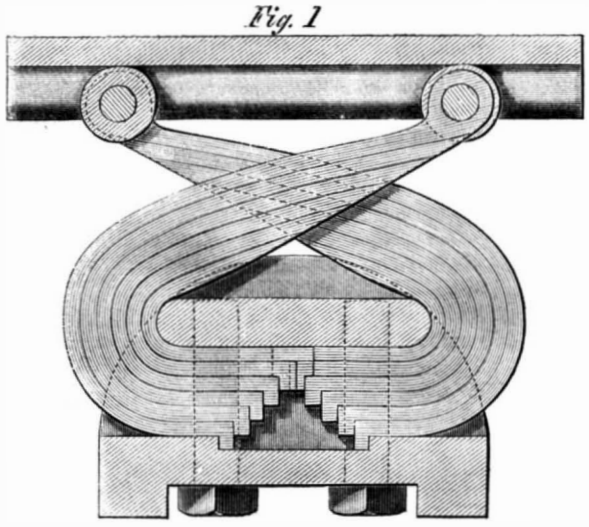
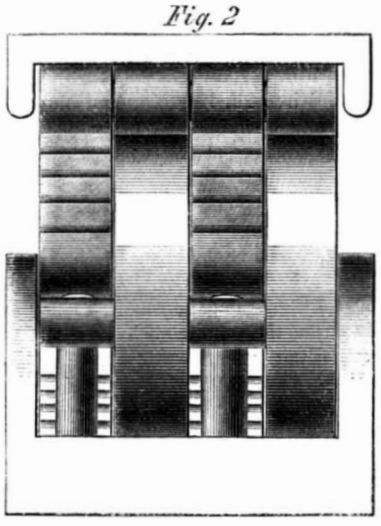


Fig. 2



TOSHACH'S CAR SPRING.

diameter, directly over the journal, and exposed to all weathers. Some one else puts a large number of small springs, about one and a quarter inches diameter, in a box, appropriately called a nest, but a very hard nest even for a freight car. Another stuffs the Camden and Amboy railroad spring full of wool and puts a series of them in a box. There is another spiral spring, however, made of a respectable looking bar of steel, an inch and a half wide and three-fourths of an inch thick, with a groove up the center of it on each side, and which is coiled into cylinder five and a half and six inches diameter, with an india-rubber cord running the entire length of the spring between the coils, and fitting into the groove referred to, thereby combining the two best known elastic substances. Without, however, referring to any more of these inventions, we will come at once to the one herewith illustrated.

The inventor of this spring claims that he has a good, elastic, compact, and cheap spring, that acts on the same principle as the semi-elliptic. It will be observed by inspecting the engraving that two or more springs are placed alongside of each other, and point in opposite directions, so as to have an equal bearing, and thereby render the spring independent, in itself, ready for being set in any position. The engraving shows the inventor's arrangement for freight cars, but there are other modifications of it included in the patent, such as a circular head over the clamp piece, made of iron or india-rubber or some other material, to assist the spring as the weight comes on it. Different descriptions of covers may also be used, and the number of steel bars may, of course, be increased or decreased in size or number, or both, so as to insure the proper degree of elasticity and strength according to the work to be done. The principle of the spring being so simple and fully represented in the engraving, we hardly think any further description of it is necessary from us, than merely to say that the full size of the spring herewith illustrated is six and a half inches long, five inches wide and six and a half inches high, which, however, need not be a standard size ; any further information may be had by addressing the inventor and patentee, William Toshach, 54 William street, New York. Patented August 30, 1864.

We observe that Mr. Wm. H. Van Gieson has become the successor to the Waterbury Machine Company, near the depot, Waterbury Conn. See advertisement. Mr. Van Gieson is an enterprising machinist.

A Large Filter.

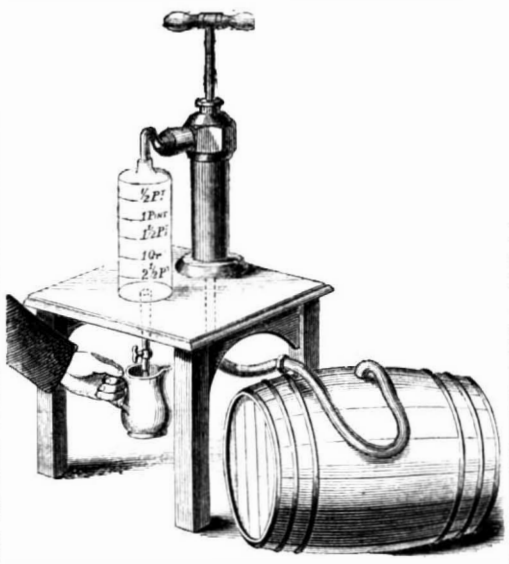
A new filter of large size has just been invented by Mr. George Hutchinson, and is being applied at the Allegheny Water-works, Pittsburgh, Pa. It is thus described:—

Mr. Hutchinson's improvement consists of an upright cast-iron cylinder, say ten feet high, and of several times the diameter of the supply pipe, of cast iron; it is intended to excavate a foundation for this cylinder, and place it upright, at the outer end of the supply pipe, with which it is to be connected by an opening, mid-hight of the cylinder which is to be open below and tight on top. The open end of the cylinder rests on broken stone, some five feet below the river bed, and it is also embedded in the same. The river water in percolating through this five feet of broken stone and gravel, to the cylinder, and thence through the supply pipe to the pump wells—will be somewhat clarified in the passage; it will at least be freed from chips, sticks, ice or leaves; it will also, it is claimed, collect a large part of the sand held by the water, and thus prevent this grit from getting into the pump valves, where it is a source of much annoyance.

In case the "tip-rap" surrounding the metallic cylinder should become so charged as to impede the free passage of the water, Mr. Hutchinson has provided for forcing a column of water out upon it, through a wash-out valve, which would readily free the pipe from any lodgment.

A NEAT THING.

In England many dealers in volatile oils, etc., use



a patented arrangement for measuring which is neat and economical and might be used in this country with advantage both to consumer and dealer. The accompanying engraving shows it clearly. The idea is to attach a glass vessel to the discharge pipe of a common pump, said vessel being graduated and marked for different qualities of the substance measured. There is a cock and a pipe at the bottom through which the contents of the glass measure can be discharged into any vessel held beneath. The pump connects by a pipe to the cask in which the oil is. This device saves evaporation, use of different measures, risk of explosion and waste from slop, and insures good measure—the whole amounting to a great deal where large sales are made.

Self-registering Compass.—A patented compass, the invention of Commander Arthur, of the British ship *Excellent*, was tried on board the *Royal Sovereign* during her cruise, and attracted much attention from officers on board. It is for registering a ship's course at sea on lined and prepared paper, working on a cylinder by clockwork, the direction of the ship's head being taken and marked by an indicator pencil every two minutes and a half. It can be placed in any part of the ship where there is no local attraction, and does not require to be placed with the ship's compass.

[This is not a new idea but its action may be more reliable than that of others made heretofore.—Eds.

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